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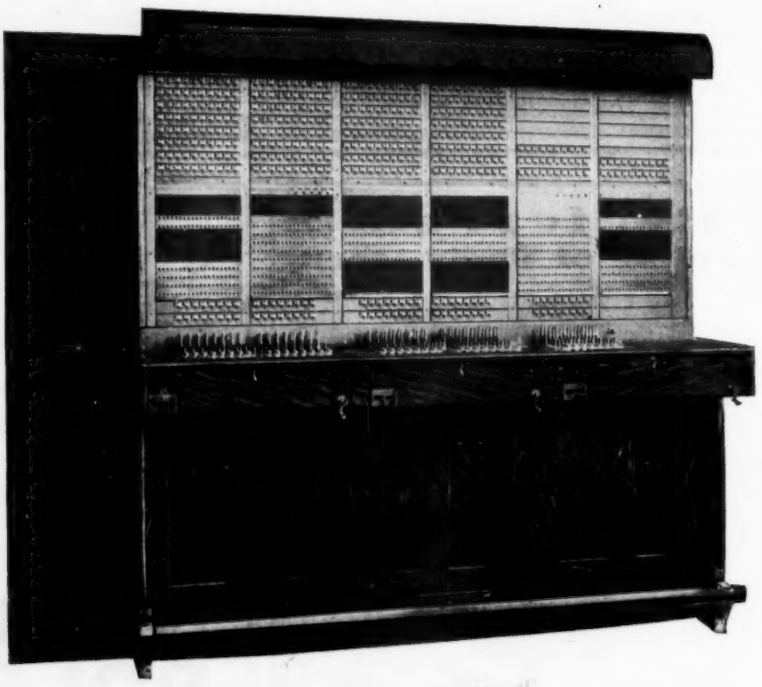

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CURRENT OPINIONS AND COMMENTS

"We are Rochester men doing a Rochester business in Rochester," says George R. Fuller, president of the Rochester (N. Y.) Telephone Corp. He was speaking of the consolidation of the two telephone systems in that city, which hereafter are to be merged under the management of the home company of which he has been the head for many years.

The New York Public Service Commission has finally issued an order authorizing the consolidation of the Home and Bell plants and the united operation of the property by the local interests.

* * * *

Mr. Fuller naturally lays emphasis on the importance of local ownership. As a leader in the Independent telephone business for many years he appreciates its advantages, both to the community and the company. The managers and the employes of the company are Rochester men. The revenues are collected in Rochester and the payroll and other disbursements are spent in Rochester. That is "Home Rule" of the right sort.

The consolidated system will include 60,000 telephones, employing about 1,200 people. The Rochester telephone interests are to be congratulated on the outcome of the long negotiations, which means the survival and continued success of a well-managed Independent system.

The city of Rochester has won a national—yes, world-wide—reputation as an unusually progressive, prosperous community, famous for its good works and high standards. There is no doubt its enlarged telephone system will do full credit to its surroundings.

In approving the Rochester consolidation, the New York commission recognizes the trend of public sentiment in favor of one telephone system to a community. As indicated, it is also a recognition of the value of local ownership and the solid good will that wise local interests can build up by efficient management.

It is noted in this connection that the Canton (Ill.) Home Telephone Co. is soon to take over the Illinois Bell exchange at that point and operate the two systems as a local enterprise. At Jacksonville, Ill., the Illinois Telephone Co., (Independent) is arranging to absorb the Bell exchange, and plans are afoot that promise a strong consolidated system.

These instances of the enduring results of efficient, conservative local operation are worth thinking about.

* * * *

Human nature impels us to "get back at" the fellow who has offended or injured us. So strong is the desire for revenge that we are willing to "cut off our own nose to spite our face." Having gone that far, some are too stubborn to admit their foolishness but continue to suffer rather than give in.

That seems to be the actuating motive back of the telephone "strikes" among subscribers in several communities. When the local company was granted an increase in rates, the subscribers declared war and cut off their service with the idea of forcing the company to back water.

They entirely overlooked the fact that

TELEPHONE TRAFFIC!

Service is what all telephone men and women are interested in, and a big factor in service is the operating room. In this room is where the traffic is handled, and be the equipment what it may, the traffic methods in vogue determine to a large extent the service furnished.

Many times, particularly in smaller telephone exchanges, managers have left the entire matter of traffic up to the chief operators or to the operators—and they have not been properly instructed. The increase in number of operating schools held in various states indicates the desire for greater operating efficiency.

There has been but little published in recent years on traffic methods and traffic handling. Realizing the need for information of this character, "Telephony" is pleased to announce that arrangements have been made for the publication of a series of articles which will cover the fundamental elementary principles of traffic work and include such questions of management as directly affect the operation of a telephone property from a traffic standpoint.

These articles will appear in "Telephony" beginning with the first issue of July and will extend over a period of about six months. They comprise a series that no telephone man or woman who is in any way connected with handling of telephone traffic should miss.

Mr. Manager, see that your chief operator gets these articles.

the company was simply obeying the law as laid down by the commission which fixed the rate, and, furthermore, that the company was obliged to put the official rate into effect.

The Bloomfield (Neb.) strikers' obstinacy resulted in the company closing the exchange, and the town, with 1,500 population, is without telephone service of any kind.

* * * *

At Cherryvale and Ottawa, Kans., the striking subscribers were more amenable to reason. At the former town, out of 400 who signed an agreement to discontinue service, only 46 ordered their telephones out, while at Ottawa less than 200 of the 2,000 patrons canceled when the new rates took effect.

The company operating at Cherryvale and Ottawa takes a highly commendable view of the incident and draws a useful lesson from it which is passed on to the employes. After relating the result of the controversy and its victory, the company tells its employes:

"These facts are not recited in an attempt to gloat over the failure of the subscribers to make good their threat, but to point out a moral, to-wit: That telephone service is indispensable to the individual and the community. However, the fact that the telephone is so indispensable should not cause us, who are in the business of giving public service, to become arbitrary and overbearing.

"It should tend, rather, to increase our desire to render better service to our communities. It should stimulate in us a desire to be fair, to give the public correct information as to the status of our affairs, and more earnestly to participate in the civic and social affairs of our communities, so that in case of misunderstandings between our business and the public, the latter will come to us for information rather than go to court or to those who will give them misinformation."

Good sense that. It emphasizes the importance of building up a good will spirit among subscribers and establishing a friendly relationship that will make such clashes an impossibility. The people do need telephone service every day in the year, and by careful cultivation they can be led to co-operate effectually with the serving company.

* * * *

Politicians who attack public utilities to win votes from the unthinking and the uninformed cut strange capers. Alarmed at the rapid growth of their taxes, because of the waste and extravagance of the city administration, Chicago citizens are indignantly demanding that Mayor Thompson and his organization shave down expenses and run municipal affairs on a more economical basis.

Just now they want to hear more about a reduced budget than the "home rule" bunk and five-cent street car fares, under cover of which taxes have increased amazingly with mighty little to show as a result.

* * * *

The mayor, in casting around for an excuse, says the high cost of living and doing business makes it impossible for his administration to effect any economies. He would like to cut down the taxes for the dear people, but the cost of materials and labor remains so high (despite a slight fall) that it is out of the question to operate municipal affairs for less than the Chicago city hall is spending now.

This explanation from the mayor wins a laugh from those who remember that he scoffed at the same defense made a year ago (when prices were higher than now) by the telephone, gas and traction companies when their applications for higher rates were attacked by the city hall.

The Chicago city hall bitterly condemned the public utilities for asking for the revenue they needed in order to give service. Furthermore, the Chicago city hall held the state commission up to public scorn for granting this necessary relief and told the voters it should be abolished.

* * * *

Both the utilities and the commission were justified in raising service rates for the very reason which the mayor now seeks to use as an excuse for the wasteful expenditures of his political organization.

The people are wise enough to detect the inconsistency of such a maneuver. They also know that a year ago the public utilities had to have increased compensation to meet increased expenses. Another thing they know is that the assertion that city expenses cannot be easily and safely cut is as insincere as the "home rule" chatter and five-cent fare talk which the city hall faction has used to get votes.

Why I, a Patron, Like Our Company

To See Ourselves as Others See Us Is Always a Valuable Aid to Progression—In This Case the Subscriber Expresses His Approval of His Telephone Company—He Likes Its Efficiency, Accuracy, and Courtesy Among Other Things

By Frank H. Williams

What are the things, Mr. Telephone Company Manager, which make the greatest hit with your subscribers?

What are the things which go to make the average subscriber be a strong booster for an average company?

Wouldn't it help you in your business to get the average satisfied subscriber's viewpoint every now and then?

If you feel that it would be worth while for you to get the average subscriber's viewpoint of the average company every now and then you will probably be interested in the following reasons advanced by the subscriber of a Middle West telephone company why he likes the company.

Here are his reasons:

The service is snappy. It is only once in a long time that I have to wait an exceptionally long time after calling for a number before getting a busy signal or getting the number called.

"Central" makes but mighty few mistakes. Once in a while the operator gives me the wrong number, but these occurrences are so infrequent that I can forgive them when they do come; also the operator at once understands the number I call for. It is very seldom that I have to repeat the number or try different ways of making "Central" understand just what number it is that I want.

The operators are always courteous. I have yet to be "bawled out" by one of the operators for not talking distinctly or for being gruff in my manner. Whenever I ask for any special service, the operators are always quick in their response and actually seem to be glad to perform the service for me.

The operators never try to flirt with me. Time was, years ago, when any peculiar

little inflection in my voice would be sure to get some sort of a "rise" out of the operator and make her start kidding me in a way which indicated that she would not be averse to doing a little flirting. Now there is nothing of that sort at all.

It is very seldom that I answer the telephone and find that the wrong party has been called. This means a lot to me, for I am a mighty busy man and interruptions of that sort not only consume a considerable amount of time but are also exceedingly annoying.

The long distance service is quick and satisfactory. I like the way that the operator tells me, when I am calling for some particularly busy line, just about how long it will be before I can get my call in.

I like the way that the company has never made mistakes in my toll bills since the new management assumed charge of the time. It used to be the case that I was always being overcharged on my toll bills—never undercharged—and this naturally gave me an exceedingly unkindly feeling toward the company. Now that feeling has entirely disappeared and I have every confidence that the toll bills I receive from the company are correct, although I still go to the precaution of checking them over before paying them.

I like the way the telephone company now collects its regular bills every month instead of quarterly. Somehow it does not make my telephone service seem so expensive when I pay for it regularly on the fifteenth of the month instead of having a big bill come in from the company every quarter.

The company's offices are always neat, clean and attractive. There is an air of efficient confidence about the employes at the windows and in the offices which makes me feel that I am doing business with a high grade institution.

It is a business-like arrangement to have signs the way the company does at each window in its offices telling which employes are concerned with contracts, which take in the money, which attend to complaints and so on. I like this arrangement of the offices and I also like the fact that the employes all look prosperous and happy. It is a pleasure to do business with people who really seem to be contented and even happy in their work.

I like the talks I have had with the general manager. He impresses me as a man who not only knows his business but who also appreciates his responsibility to the public. He seems to realize the fact that the manager of a telephone company is, in a sense, a public character. It gives me confidence in the future of my home town to feel that a man who is appreciative of the importance of good telephone service to the growth and prosperity of a city is the active manager of the telephone company that is serving our city.

Any Voice Inflection Would Be Sure to Get a "Rise" Out of the Operator.

It is interesting and informative to read the company's newspaper advertising. This advertising never howls at the public for the mistakes it makes, but pats the public on the back, suggests ways in which subscribers can help to improve the service and emphasizes the company's own endeavor to constantly improve the service.

This advertising, too, has told me a lot of interesting things about the inside workings of the telephone business which I had never suspected and would never have learned about if it hadn't been for these ads. I feel that these advertisements have been instrumental in giving me a better idea of the company's problems and have made me more tolerant of such mistakes as do occur.

I like the way the company throws its plant and offices open to the public and every now and then entertains specific organizations at dinner in its restaurant or assembly room and then takes the members of the organizations through the plant on inspection tours under the guidance of relief operators. It is stunts like these which thoroughly convince me that the company is not pursuing and does not intend to pursue any "public be damned" policy.

It's a Relief Not to Find a "Line-up" a Block Long Before a Public Telephone Booth.

I like the interest manifested by the operators in their work as is shown by their demeanor and by their work on these inspection tours. I also like the evidence of thorough training which these girls show on these tours.

The company's policy of placing public telephone booths about the city where they will do the most good is another point about the company which I like. It is a relief to be able to secure a public booth when it is wanted without finding a line-up a block long ahead of me trying to get into it. Of course, the placing of a sufficient number of booths at all strategic points is the reason that the booths are not overcrowded.

I like the reports of employes' meetings which appear in the paper from time to time; better still, I liked the spirit manifested at one of these meetings which I attended on the invitation of the general manager one time when I made a complaint to him personally. I found that the employes were discussing problems of their daily work with great freedom and great enthusiasm and that there was apparently a deep liking among them for their work and for their jobs. This fact seemed to me to indicate the real reason why the company's service is so constantly satisfactory.

It is a satisfaction to find the executives of the company taking their proper places in local affairs and doing their bit in the Chamber of Commerce, Kiwanis club, Rotary club, Ad club and other local business organizations. There is no spirit of aloofness from the general public among the employes or the executives of this telephone company.

Study these points carefully. Is *your* company doing everything possible to secure the esteem and liking of its subscribers?

If not, your company is not functioning at 100 per cent.

And if it is not doing so, start to make all your subscribers like your company.

And start *now!*

New York Bankers Telephoning to Cuba Over New Line.

An interesting sidelight on the critical Cuban financial condition is found in the fact that the New York City banks with important issues of securities in Cuba now are using the telephone exclusively for transacting business with the island.

It is much more rapid and satisfactory than the cable, they say, and connections are made in something less than half an hour. One banker said that he had completed a deal recently in ten hours that by cable would have taken him ten days.

Theory of Guided-Wave Telephony

Principles of Multiplex Telephony—High Frequency Equipment—Practical Results of Utilization of Metallic Circuits for Guided-Wave Telephony—Difficulties Encountered in Practice—Paper Presented Before the Franklin Institute

By Charles A. Culver, Ph. D.
Canadian Independent Telephone Co., Toronto

Certain discoveries or achievements in the realm of science stand out preeminently as marking the beginning of new epochs in the world's progress. Such was the invention of the magnet telegraph by Morse, the telephone by Bell, the discovery of radio-activity by Becquerel, electromagnetic waves by Hertz, and X-rays by Röntgen; the invention of the audion by DeForest and guided-wave or high-frequency multiplex telephony and telegraphy by Squier.

Prior to General Squier's invention it had been possible to simultaneously transmit several telegraph messages over a single telegraph circuit, and while certain earlier attempts had been made to develop a system of syntonic multiplex telegraphy, it is to the man who is at present Chief Signal Officer of the United States Army that the world owes the invention of a system of communication by which it is possible to carry on as many as ten or more two-way simultaneous telephone conversations over one electrical circuit.

In 1910, Major General Squier (then major), by a bold and ingenious adaptation of the fundamental principles and apparatus previously employed in radio-telegraphy and telephony, developed the multiplex system which bears his name, and thereby established a distinct branch of the art of communication.

Principles Involved.

The fundamental principle underlying the Squier system of multiplex telephony is that of high-frequency electrical resonance. Previous attempts to solve the multiplex problem had been based, largely, on electro-mechanical resonance.

Figs. 1 and 2 are reproduced from Squier's original disclosures. Fig. 3 is a simplified diagram illustrating the fundamentals involved. A source of continuous high frequency electromagnetic waves of definite frequency are impressed upon the physical circuit by means of the air core resonance transformer $L_1 - L_2$. By means of the variable condenser C_1, the circuit, consisting of the two parts of the line and the bridging elements just referred to, is brought into electrical resonance with the impressed high frequency E.M.F.

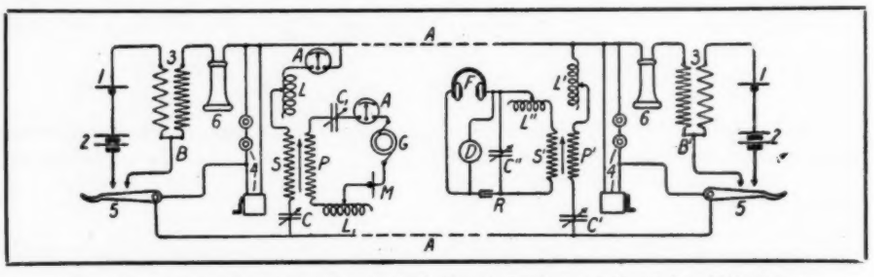

Fig. 2—Another Circuit of Squier's Original System of Multiplex Telephony.

Referring to the well-known relation:

$$I = \frac{E}{\sqrt{R^2 + \left(\omega L - \frac{1}{\omega C}\right)^2}}$$

it is evident that the current in the line will be a maximum when resonance obtains; that is, when the inductive reactance equals the capacity reactance or $\omega L = 1/\omega C$. This condition will be indicated by the reading of the ammeter A. Fig. 4 shows two typical resonance curves made from data secured in actual engineering practice.

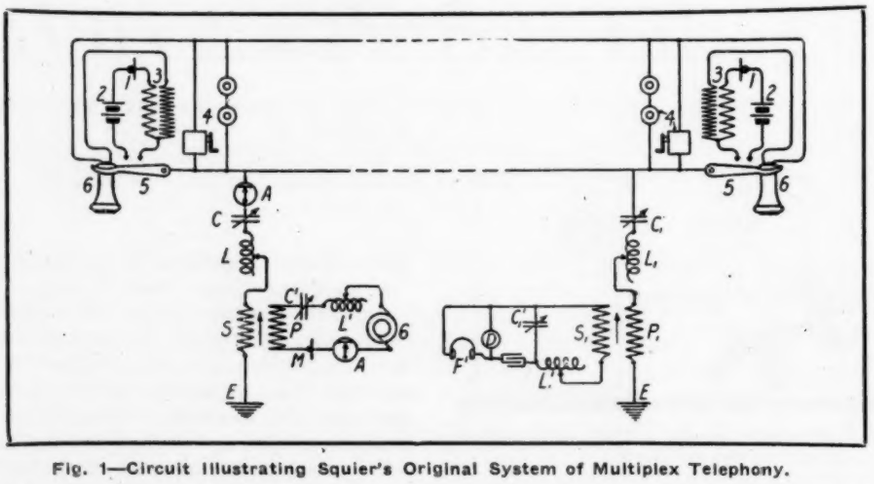

Fig. 1—Circuit Illustrating Squier's Original System of Multiplex Telephony.

In Squier's original investigations the source of high frequency energy (see Figs. 1 and 2) was a high-frequency alternator. The impressed energy was voice modulated by means of an ordinary microphone, thus giving rise to a modulated high frequency "carrier wave" in the physical line.

To detect and translate this "carrier wave" at the receiving end of the line, a circuit arrangement similar to that shown at the right of Fig. 3 is employed. The local receiving organization is inductively coupled to the line through the air-core resonance transformer $L_3 - L_4$.

In adjusting the receiving equipment to abstract maximum energy from the line the bridging elements, L_3C_2, are adjusted to resonance with the frequency of the carrier wave and the local translating circuit is likewise adjusted to resonance with circuit L_3C_2.

The voice current is recovered from the modulated carrier wave by means of a primitive audion hook-up as shown in Fig. 5. This will be discussed in detail later. At this point it suffices to note that the receptor is an integrating translator, which delivers to the telephone receiver a varying unidirectional current corresponding to the voice current supplied to the modulating device at the transmitting station.

It is thus evident that we have the elements of a radio-telephone installation, the essential difference being that in place of the connections to earth and the usual antenna, we have, in this case, connections to the two wires constituting a physical pair. The two fundamental factors, then, in the Squier system of multiplex are *the utilization of electrical resonance and the use of an integrating translator.* Whether the frequency of the carrier current is low or high does not modify the basic principles involved.

In this system, electromagnetic waves of predetermined length are guided by the metallic circuit, instead of radiating

in all directions from an antenna. While there undoubtedly is a certain amount of radiation from the physical line, the overall efficiency of the guided-wave system is obviously materially higher than in the case of a free-wave system. This is thoroughly confirmed by experience.

Delay in Practical Application.

Following the original disclosures by General Squier, the author, and doubtless others, began the study of this new method of communication. During 1913-15 the writer conducted a series of guided-wave telegraphic tests over the telegraph lines of the Chicago, Milwaukee & St. Paul Railway and the Delaware, Lackawanna & Western, employing damped-waves and comparatively crude equipment. These experiments established the fact that guided-wave telegraphy over practical distances between stations, and between stations and moving trains, was possible. Telephony by this means was not attempted because equipment for producing undamped waves was not available.

Indeed one of the principal factors which tended to delay (Squier's U. S. patents are dated Jan. 3, 1911) the practical application of this new system was the nature and cost of the power unit. The inventor in his original investigation had at his disposal one of the two high-frequency alternators existing on his continent. This, however, was not the only reason why the Squier system of multiplex did not come into commercial use until a comparatively recent date.

A paper by General Squier describing in detail the original investigations connected with his invention was read before the Chicago meeting of the A. I. E. E. on June 28, 1911. This paper was later published as a professional paper by the Signal Corps of the United States Army. A critique of this paper by Doctor Jewett, chief engineer of the Western Electric

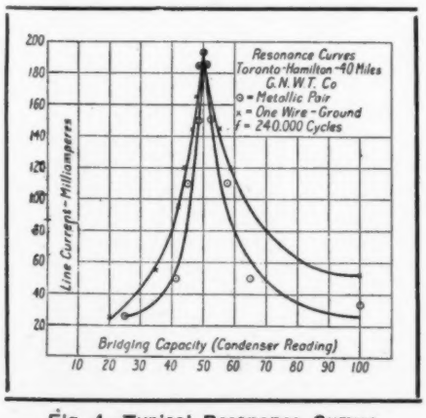

Fig. 4—Typical Resonance Curves.

Co., and others, also appeared in the issue of the Proceedings of the A. I. E. E. which carried the original paper by the inventor.

In his criticism of the Squier method of multiplexing, Doctor Jewett took the position that the use of a carrier wave of comparatively high frequency would be impracticable owing to the extremely great attenuation which would obtain. We shall refer in a later paragraph to Doctor Jewett's comments.

It suffices here to say that it is more than probable that the adverse criticism by so eminent an authority in the telephone art as Doctor Jewett effectively served to discourage, for a considerable period of time, those who might otherwise have been inclined to give practical application to General Squier's invention. Subsequent events have clearly shown that this criticism was not well founded. Indeed, the system of multiplex developed by General Squier is understood to be at the present time in commercial use by the A. T. & T. Co. and is being rapidly extended by this and other commercial interests throughout the world.

Three-Electrode Tube and Its Relation To Multiplex.

Reference has been made to the nature of the source of high-frequency current originally available. Owing to the exigencies of the war, the audion, invented by Doctor Lee deForest, came into wide use in the radio art as a detector and amplifier. It also came to be extensively used as a source of high-frequency alternating current, and as a modulator of such currents. As before indicated, the invention of the three-electrode thermionic tube marked an epoch in the art of communication, and the development and perfection of this device as a simple and inexpensive generator of high-frequency alternating currents made possible the wide practical application of the Squier system of multiplex.

In order to clearly outline current engineering practice in this new art it is necessary to briefly review certain fundamentals connected with the audion, or three-electrode thermionic valve. Recalling the well-known characteristic of such tubes, viz., that only negative charges (electrons) pass from the filament F (Fig. 5) to the plate P, it is obvious that any negative charge on the central electrode will tend to diminish to migration of electrons from F to P.

In short, if the grid G is caused to vary in potential the current in the circuit P B T F will vary in a corresponding manner. Further, if the tube forms part of an organization, as shown in Fig. 5, and an alternating E.M.F. is developed in the inductance L_4, the condenser C will become charged as shown. It is thus evident that the audion is an integrating device.

If an alternating E.M.F. of varying

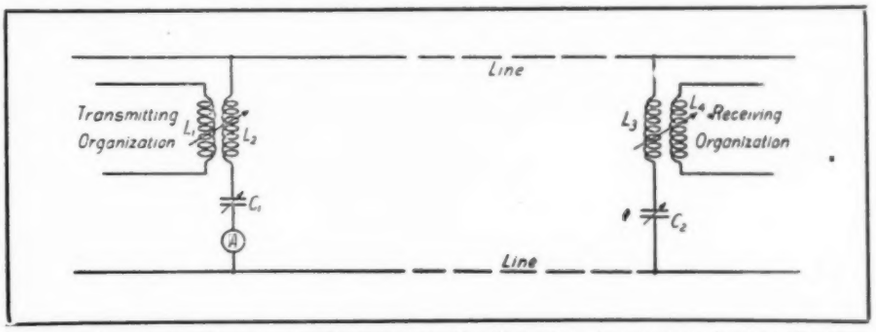

Fig. 3—Simplified Diagram Illustrating the Fundamentals Involved in Squier's System.

amplitude be developed in the inductance L_4 by associating the inductance with the bridging inductance L_3, as shown in Fig. 3, the audion[1] will serve to integrate and translate the carrier wave into a varying unidirectional current in the circuit containing the telephone receiver T, Fig. 5. This process is graphically shown in Fig. 6. It is seen from the last curve in the figure that the current through the receiver corresponds to the envelope of the line current. In this manner the voice current is "recovered" from the high-frequency carrier current which is guided by the physical circuit.

From the foregoing remarks regarding the audion it is evident that the device is inherently a repeating and an amplifying agent. Since the plate circuit accurately reproduces the potential variations in the grid circuit it thus becomes possible to magnify or amplify the energy originally supplied to the grid-filament, the local battery B supplying the necessary energy.

Thus if the mean value of the amplitude of the carrier current is too small to give a tone intensity of commercial value in the telephone receiver T, we may arrange to have the output from the first detector tube feed the grid-filament cir-

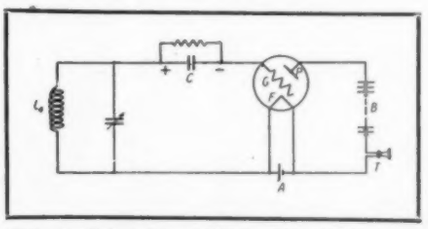

Fig. 5—Primitive Audion Circuit for Recovery of Voice Current from Modulated Carrier Wave.

cuit of a second audion through a suitable transformer as shown in Fig. 7.

If greater magnification is required, several such amplifying tubes are con-

[1] It is probable that General Squier was the first to use the audion in connection with speech or telegraphic transmission over physical circuits.

various electrical disturbances in the physical circuit, it is found impractical to use more than two amplifying tubes, nected in series. However, because of when connected as shown, in addition

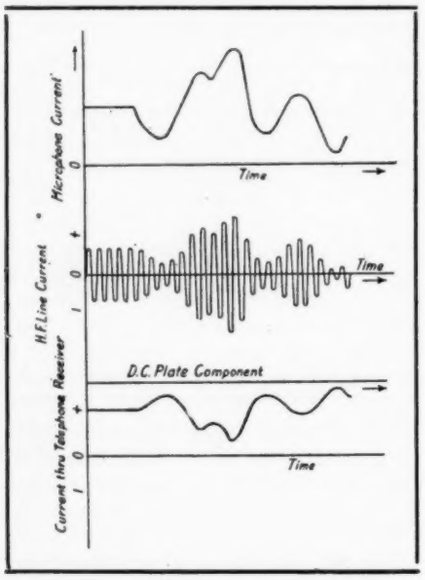

Fig. 6—Integration and Translation of Carrier Wave Into a Varying Unidirectional Current.

to the original detecting or translating tube.

It is, however, with the audion as a generator of high frequency alternating currents that we are principally concerned. Recalling the repeating and amplifying characteristics of the audion, it is easy to see that conditions may be so arranged that the plate circuit will react upon the grid circuit and thus automatically effect a variation in current in the plate circuit itself.

Referring to Fig. 8, if an inductance L_p, for example, be inserted in the plate circuit any variation in the potential of the grid will, as before indicated, result in a variation in the current in the plate circuit and hence a change in the potential at the terminals of the inductance L_p. Since L_p and L_g are inductively associated, this potential variation in L_p will cause a corresponding variation in L_g, and hence in the potential of the grid. This change will again cause a change in

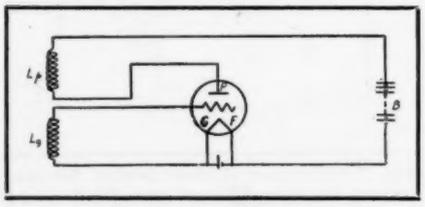

Fig. 8—Diagram Illustrating Changes in Potential Due to Curren Variations in Plate Circuit.

I_p, which will again react to cause a change in E_g.

It is thus evident that there has been initiated an electrical cycle of operation which tends to repeat itself indefinitely, the energy necessary to sustain this cycle being derived from the battery B. The cycle usually starts automatically with the closing of the filament circuit.

The frequency of the cyclic process is governed by the value of the inductances in the plate and grid circuit and any associated capacity. In short, the audion thus becomes a source of alternating current, energy being abstracted from the audion organization by associating with it an independent resonant circuit (see Fig. 10) or by electrostatically coupling to an energy-absorbing system. The simplicity and constancy of such a source of alternating current makes guided-wave telephony a practical every-day accomplishment.

Not only does the audion act as a generator of high-frequency alternating currents and a detector of them, but it may also functionate as a modulating device.

Speaking broadly, there are three general methods of utilizing the audion for the purpose of impressing the ordinary microphonic voice current upon the high-frequency carrier current.

One of the most commonly used arrangements for accomplishing this is shown in Fig. 9. This circuit is variously called the "choke coil," "constant current" and "Heising" method. By referring to Fig. 9 it will be noted that there are two tubes in parallel, the plate voltage being supplied by a direct current generator or rectifier unit. The power tube OVT, together with the associated $L_3C_2L_4$, constitute the high-frequency oscillating circuit. The air core choke L_2 prevents the high-frequency current from passing back through the generator and modulating units.

The tube MVT, and the associated microphone M and transformer T, form the modulating unit. If the microphone M be spoken into, an alternating E.M.F. will be developed in the secondary of the transformer T, the wave form of this E.M.F. corresponding to the upper curve in Fig. 6. The grid, or control electrode, of the modulating tube is thus subjected to a varying potential.

As previously pointed out, this will result in what amounts to a variation in the internal resistance of the modulating tube MVT. Therefore, the current passing through the tube between the plate and filament will vary in a corresponding manner. Because of the presence of the choke coil L_1, the total current drawn from the direct current generator cannot change rapidly, and since the two audions are in parallel, it follows that if the current through the tube MVT increases, that through OVT must decrease, and vice versa.

Thus the power supply to OVT will be modified in conformity with the voice current impressed upon the modulating tube. It therefore follows that the output of the oscillating power tube will likewise vary, and thus the carrier wave emitted by the circuit $L_3C_2L_4$ will vary in amplitude, or, as it is usually expressed, be modulated. This method of modulation is very satisfactory for units of small output, but possesses the disadvantage that at least two tubes are required.

A second method is known as "direct grid" modulation. A circuit operating on this principle and which gives good results in guided-wave practice is shown diagramatically in Fig. 10. In this case the microphone is coupled through the modulating transformer T directly to the grid of the oscillating power tube. The potential of the grid will thus be caused to vary in conformity with the microphonic voice current, and the power output of the tube will vary in a corresponding manner.

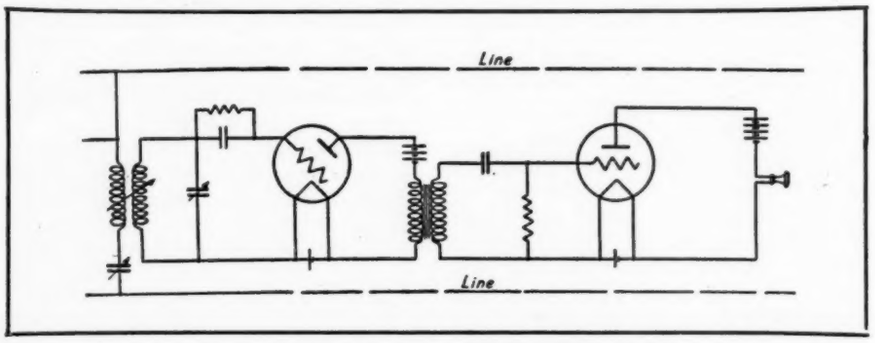

Fig. 7—Circuit of Audion as an Amplifying Agent.

With the particular circuit shown, the completeness and accuracy of the modulation of the emitted carrier wave is largely determined by the mutual inductance between the plate and grid coils L_1 and L_2. The method of modulation just outlined possesses the advantages that but one tube is required, and that the modulation may be easily adjusted.

The third general method of utilizing the three-electrode tube as a modulating agent is shown schematically in Fig. 11. In this organization the plate circuit of the modulator tube is connected as a shunt to a part or all of the secondary or bridging inductance L. The variations of the grid potential effected by the associated microphonic circuit causes the modulating tube to act as a variable resistance in parallel with this inductance and thus tends to functionate in part as

an energy absorbing agent and in part as a detuning device. The result is that the energy supplied to the line by the oscillating tube is caused to vary in accordance with the original microphonic current.

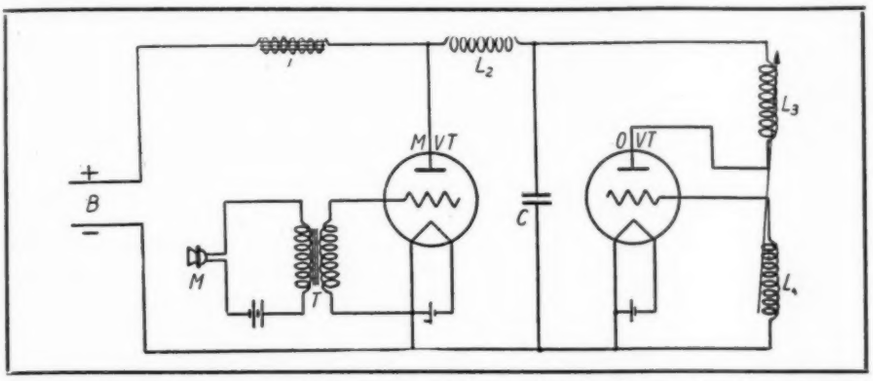

Fig. 9—Commonly Used Arrangement of Using Audion for Impressing Voice Current Upon Carrier Current.

This system possesses the disadvantage that at least two tubes are required and also that the modulation is more or less incomplete, thus resulting in a comparatively low value of tone intensity at the receiving end. Incidentally it may be added in this connection, that a more satisfactory "absorption" arrangement in guided-wave practice is to insert the microphone itself directly in the bridging circuit, either between X and A or between C and X_1.

From what has been said in outlining the behavior of the three-electrode tube as a detector, an amplifier, an oscillator and a modulator, the present method of accomplishing high-frequency multiplex telephony is more or less obvious. We may, for example, bridge across a physical telephone or telegraph pair or between a single wire and the ground, several transmitting organizations similar to that shown in Fig. 10, each transmitting unit being permanently adjusted to deliver to the line a voice modulated high frequency current of a definite and fixed periodicity.

At the receiving end of the line a corresponding number of receiving units, similar to that shown in Fig. 7, are bridged across the same physical circuit. Each receiving unit is "tuned" or brought into electrical resonance with a certain transmitting set. Speech may then be carried on over any one or simultaneously over all of these super-channels.

Each party to a conversation utilizes a carrier frequency, two such frequencies being required for a two-way conversation. When the carrier waves are properly selected, there is no mutual interference or "cross talk" between the super-channels; neither are the guided-wave conversations heard in the ordinary physical telephone apparatus, and the transmission over the physical circuit is inaudible in the multiplex equipment.

Number of Super-Channels.

The maximum number of two-way guided-wave channels, which may be simultaneously operated over a single physical circuit, depends somewhat upon the electrical constants of the particular line and also upon certain inherent limitations of the multiplex system itself.

It was noted above that two carrier waves are usually employed for carrying on a two-way conversation. As a result of the well-known principle of interference, if two alternating currents coexist in a physical circuit, there will also obtain a third alternating current whose frequency will be equal to the numerical difference between these two original frequencies.

If the two primary frequencies are near enough together, the resulting "beat" frequency will have a value which, if the resultant current reaches the receiving apparatus, will manifest itself as a high-pitched note. In short, an electrical "beat tone" will exist, and, unless eliminated by means of elaborate electrical filters, will prove to be a disturbing factor in the guided-wave telephonic transmission.

When it is recalled that the average human ear can begin to sense a tone when its frequency is not greater than 20,000, it will be evident that the frequencies of the two-carrier waves utilized for a two-way conversation must differ by at least 20,000. For example, if one carrier frequency is 100,000, the other carrier frequency must either be 80,000 or 120,000.

Further, it will also be obvious that the lowest carrier frequency which can be used must be greater, theoretically at least, than this upper limit of audition, viz., 20,000. In practice, however, it is found that a fundamental carrier frequency of about 15,000 may be used.

The upper practical limit of carrier frequency has not yet been definitely determined. As before indicated, it was maintained by those who originally attempted to point out the limitations of this system of communication that, owing to supposed attenuation effects, frequencies of the order of 100,000 would be entirely impracticable. The engineering research of the Signal Corps and of the writer has clearly demonstrated that frequencies of the order of 500,000 are entirely practical. There is reason to believe that frequencies as high as one million per second may possibly be utilized in multiplex practice.

However, as a basis of discussion, if we take the limit as 15,000 and 500,000, respectively, and remember the further limititation imposed by the possibility of "beat notes" between the fundamental carrier frequencies or between the first harmonic of one carrier wave and the fundamental of the next, it follows that at least six simultaneous guided-wave two-way conversations are entirely practicable over a single physical circuit—and this in addition to the usual two-way telephone or telegraph traffic.

It, therefore, follows that we have here a system of communication which makes it possible to increase the telephonic traffic-carrying capacity of a given line at least six-fold, and, when distances of the order of 100 miles or more are considered, at a cost of substantially lower than that necessary to construct and maintain additional physical lines.

There is reason to believe that the number of high frequency multiplex telephone channels that may be superimposed upon a single physical circuit may, in the near future, be doubled.

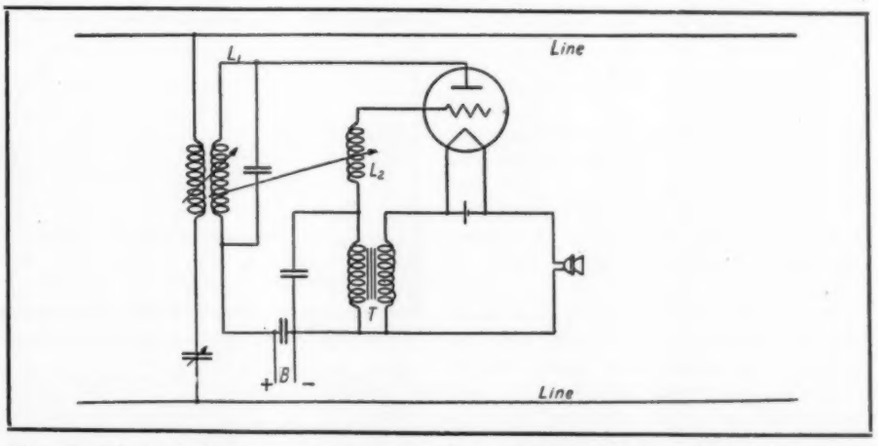

Fig. 10—"Direct Grid" Method of Using the Three-Electrode Tube as Modulating Agent.

It is possible to arrange a circuit of such a character that it will deliver high-frequency currents to the line only when conversation is taking place.[2] With such an arrangement both parts of a two-way conversation could take place on carrier waves of the same frequency; in fact,

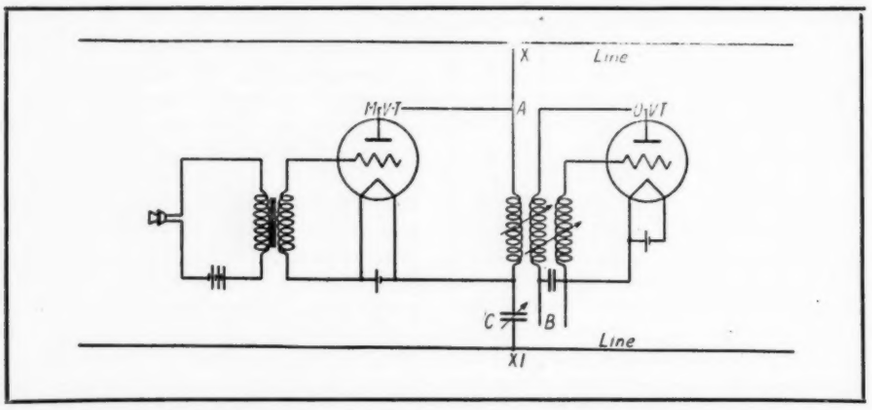

Fig. 11—A Third Method of Modulation Using the Three-Electrode Tube.

true duplexing would obtain. Therefore instead, for example, of six simultaneous two-way conversations it would be impossible to establish 12 super-channels. A circuit which is said to accomplish this end is shown in Fig. 12.

By reference to the figure it will be noted that the voice current is amplified by the tube *AVT*, and that the plate circuit of this amplifying tube supplies energy to the primary of the audio-frequency transformer T_2. The secondary of this transformer serves as a source of anode potential for the oscillating power tube *OVT*. It is thus evident that the high-frequency power circuit will not deliver energy to the line except when sound waves impinge upon the microphone.

The author has designed a circuit of such nature that the tube which acts as a high frenquency oscillator will also serve as a detector, thus making it possible to utilize the same tube for both transmission and reception.

This step has been made possible as a result of the discovery by the author that it is possible to design a circuit of such a nature that it will oscillate without any *B* potential, in the commonly accepted sense of the term. Further, this new circuit may be so adjusted that the "regenerative" state will obtain, thus making the organization highly sensitive as a detector.

By properly associating a microphone and a telephone receiver with this new circuit, it has been found possible to design an organization such that one tube functionates as both oscillator and detector, and further that no energy is delivered to line except when one speaks into the microphone.

[2]See General Electric British Patent No. 15.237—1915. Also "High Frequency Multiple Telegraphy and Telephony on Wires," by H. Fassbender and E. Habann, Jabrh. d. Drahl. Tele., October, 1919.

While the engineering development work on this new circuit has not reached the point where equipment is manufactured on a commercial scale, yet the result of the experimental work thus far carried out justifies the statement that it is possible to design a practical multiplex telephone unit of comparatively small size, and which will serve to double the number of high frequency multiplex conversations which may be simultaneously carried on over a single physical circuit.

In considering the question of the maximum number of superchannels between any two points, the problem arises concerning the utilization of adjacent physical circuits on the same pole lead. Experience has shown that under certain conditions there is no crosstalk between adjacent parallel superchannels, while under other conditions crosstalk will obtain. It has been found that excessive transpositions are unnecessary. It is, therefore, possible to operate high-frequency superchannels over adjacent parallel physical circuits.

If traffic conditions are such that it is unnecessary to utilize more than one physical circuit on a pole lead as a basis for superchannels, and conditions are such that high-frequency cross talk occurs between adjacent metallic circuits, the natural procedure is to electrostatically connect the several physical pairs in parallel through the high-frequency bridging circuits, thus collecting and utilizing a part of the energy which would otherwise be wasted.

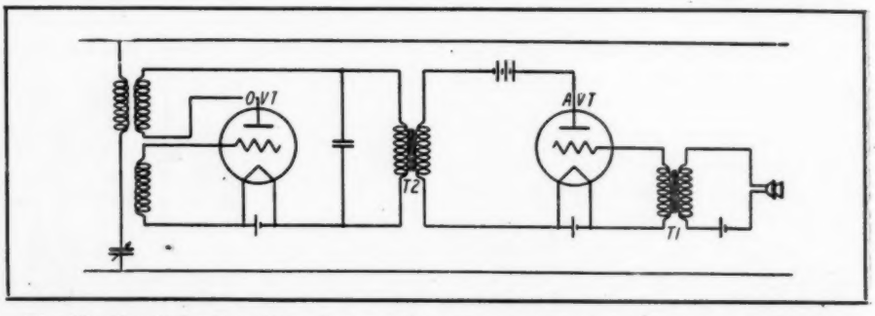

Fig. 12—Circuit for Two-Way Conversation on Carrier Waves of Same Frequencies.

Conductors Which May Be Used.

In considering the utilization of the various metallic circuits which may serve to guide the high-frequency carrier currents, we come to a consideration of the effect of the material constituting the physical circuit.

Experience has shown that copper, copper-clad iron, and aluminum wire may be used. It has been found in practice that solid copper and copper-clad conductors of equal surface area have practically the same conductivity, and hence serve equally well as guiding media for high-frequency carrier waves. Ordinary galvanized iron wire, however, will not answer. It has been found, for example, that 12 miles of No. 12 galvanized iron telephone wire will completely obliterate all resonance effects, and that it is not possible to effect a transfer of energy unless frequencies of the order of 20,000 are employed.

These practical results are consonant with the effects which may be predicted from theoretical considerations. Preuner and Pungs[3] have shown by measurements that the zinc coating on iron wire must be substantially thicker than that of a copper exterior to effectively shield the iron core.

It is of both theoretical and practical interest to find that high-tension power lines may be utilized as guides for high-frequency carrier waves, and without any interference to multiplex telephonic transmission from the low frequency power currents.

In making use of a power line to establish guided-wave telephone service, the high-frequency equipment is electrostatically coupled to the power line by suitable high-tension condensers or by connecting directly to a wire of a few hundred feet in length, supported parallel to and within a few feet of the power wires and thence to earth.

A system employing the first method has been in practical operation in Japan for more than a year. An installation[5] utilizing the second plan mentioned is in use in Germany. The practical utility of this aspect of guided-wave communication is obvious. *(To be continued.)*

[3]"Electro-plated Iron in High-Frequency Fields," by G. Preuner and L. Pungs, Verhandlungen der Deutschen Physikalischen Gesellschaft, September, 1919.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell

Quiz Questions on the Preceding Installment.

1419. What is the aggregate result of the operation of line relay *B*, Fig. 318? How many contact springs, on line relay *B*, will be required to bring about the operation of circuits like those shown in Fig. 318? Describe briefly the function of each pair of relay contact springs shown on line relay *B*, Fig. 318. Trace the circuit over which energizing current flows through the winding of slow-acting relay *DD*. Trace the circuit over which current flows through the winding of slow-acting relay *DD* in such a way as to retain its armature in the operated position, should slow-acting relay *CC* be released. Do you understand that slow-acting relay *DD* is energized and released each time that a line relay *B* in a group of lines with which it is associated is operated? Will slow-acting relay DD, having once been operated, be released immediately after line relay *B* is released? When is line relay *B* released?

1420. What is a result of the operation of slow-acting relay *DD* insofar as slow-acting relay *CC* is concerned? Trace the circuit over which the initial energizing current flows through the winding of slow-acting relay *CC*. Will slow-acting relay *CC* release its armature immediately upon the release of the armature of slow-acting relay *DD*? If not, why not? When calls are being rapidly received from the group of lines with which slow-acting relays *CC* and *DD* are associated, is it your understanding that these two relays, *CC* and *DD*, will be energized and released or that they will remain energized and retain their armatures in the operated position? What condition will bring about the operation of slow-acting relay *K*? Which relay controls the energizing circuit of slow-acting relay *EE*? Under what conditions will slow-acting relay *EE* be *not* operated when a line relay *B* in the same group of line circuits is operated? Explain in your own words the relations between slow-acting relays *DD, CC, EE* and *K*.

1421. What relays must be normal in order that switch magnet *LL* may be energized? Under the conditions assumed to be necessary in order that switch magnet *LL* may be energized, explain the conditions resulting from the operation of switch magnet *LL* and state whether, in your opinion, the motion of the wipers driven by switch magnet *LL* over switch banks *H, I* and *J* will be rapid or slow. Explain how the movement of the switch wiper over the contacts in switch bank *H* will rearrange the order in which trunk circuits will be seized by incoming calls. Analyze the function of the wires leading to switch banks *I* and *J* and explain the purpose of shifting the ground contact from one to the other as switch magnet *LL* is alternately energized and de-energized. What is your opinion of the purpose of the equipment comprising relays *CC, DD, EE, FF, GG, LL* and *K*? How many similar sets of equipment must be provided for each group of subscribers' line circuits?

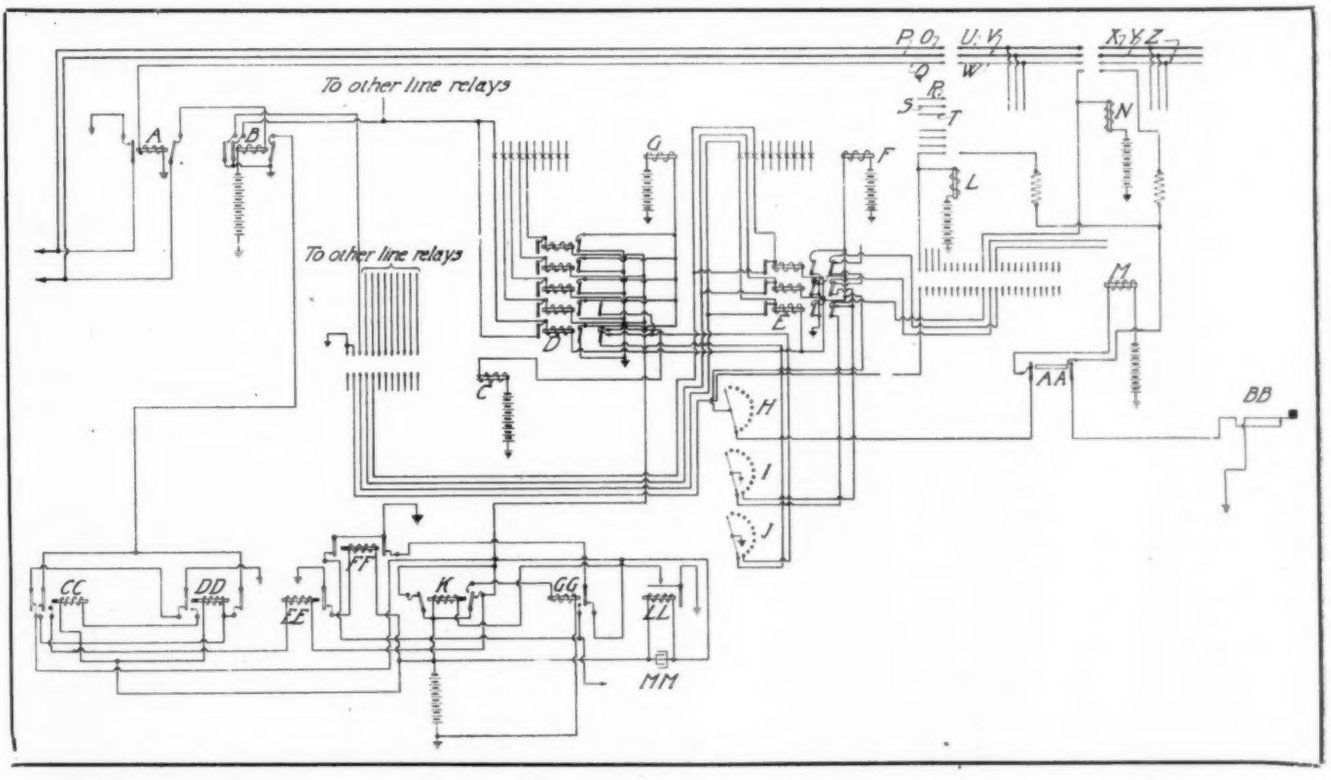

Fig. 318. Trunk Rotation.

CHAPTER XXXIII Operating Combinations Including Switches, (Continued.)

1422. *Interexchange trunking possibili-*

ties.—In the brief consideration that has been given to the system of selecting calling line circuits by relay combinations, as shown schematically in Figs. 315 and 318, it has been assumed for the sake of simplicity that the lines in which calls originated were subscribers' telephone circuits and the trunks to which the calls were finally connected were the cord and plug or other connecting devices in a single office telephone exchange.

It is of great value, in the dispatch of telephone traffic, to have equipment operating along lines similar to that which has been briefly described. The possibilities as to the equalization of service standards to all subscribers are very great. This means that the abnormally quick service received in ordinary manually-operated telephone systems when the traffic is light is entirely eliminated, while the abnormally poor service that must be received by some subscribers in such systems during the period of peak traffic load is vastly improved.

While the type of selection described is of great use in handling traffic from subscribers' telephones, it is just as adaptable to the dispatch of inter-office telephone traffic, and the advantages are at least as marked in that kind of service. Inter-office telephone traffic requires facilities far in excess of the average load to be handled, the number of trunks being determined by the maximum density of the traffic.

1423. *Inter-office traffic distribution.*—For this reason it is advisable that the traffic to be dispatched between offices be uniformly distributed to the inter-office trunk circuits, just as it is advisable that the traffic originating in subscribers' telephone stations be uniformly distributed to connecting trunk circuits as far as such uniform distribution is possible. These considerations are very closely related to the study of the "Nature of Telephone Traffic" and need not be reviewed here except so far as a review may be necessary to point out a similarity between traffic distribution to connecting trunk circuits from subscribers' stations and secondary distribution to inter-office trunk circuits.

Assume for the sake of argument that the general distributing scheme shown in Fig. 304 has been used and that two similar offices are involved. If the outgoing trunk circuits are multipled before the operators' positions in the usual manner, a satisfactory traffic distribution between them may be realized; but there are certain advantages in distributing traffic to the trunk circuits along lines similar in a general way to the scheme shown in Fig. 318 which cannot be realized by the use of an ordinary multiple of outgoing trunks.

1424. *Advantage of inter-office traffic distribution.*—The most obvious advantage in the relay selection is the economy in trunk time that is effected. When relay *AA*, Fig. 318, is released, the trunk *X*, *Y*, *Z*, is instantly made available for another call. Relay *AA* would necessarily be connected so that it would be released as soon as the calling subscriber replaces his receiver upon its hook. With the ordinary manual inter-office trunk connected to a multiple jack at one terminal and to a cord and plug at the other, the release of the trunk circuit involves some additional operating function after the telephone receivers have been replaced.

This is true regardless of how the system may be arranged and applies to modern high efficiency systems as well as to the conventional manually-operated type. In inter-office trunks which appear in multiple jacks before the operators' positions at the outgoing terminals, it is impossible to realize rotation of the trunks in service. When the outgoing load is light, the first trunk of a group is assigned by the distant B operator and it is only when the traffic load becomes heavy that the trunks which appear farther along in the switchboard equipment are used.

With a system of relay selection such as that shown in Fig. 318, all of the outgoing trunk circuits will be uniformly used and will be automatically rotated in service. Both of these effects result in an economy as to the amount of plant that must be laid aside for inter-office trunk circuits when relay selection is used as compared with the amount that must be laid aside for the same amount of inter-office traffic when ordinary manual methods of operation are employed.

It is true, of course, that these advantages will be realized from the use of any efficient type of mechanical traffic distribution to the trunk circuits and are not exclusively realizable from the equipment shown schematically in Fig 318.

(To be continued.)

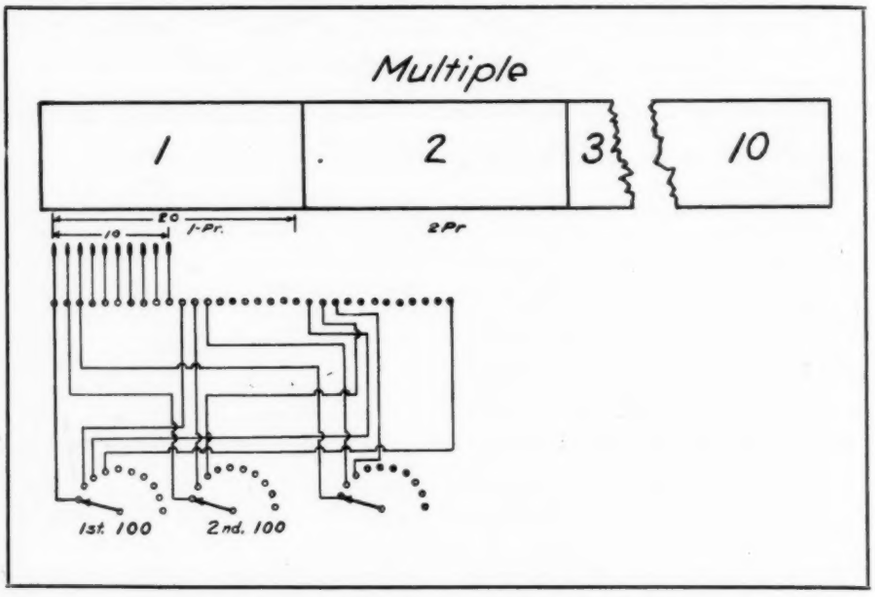

Fig. 304. Principle of the Manual Call Distributor.

New Equipment to Be Installed by Rushville (Ind.) Co.

George Davis, manager of the Rushville Telephone Co., of Rushville, Ind., has announced that the company has placed an order for the purchase of equipment which will enable each town in the county to have direct dial access with Rushville subscribers.

The equipment is being purchased for the exchanges in Milroy, Falmouth, Arlington, Mays, New Salem, Orange, Raleigh and Carthage, and will enable the company to furnish quicker, better, and more accurate service between every exchange in the county, according to Mr. Davis.

Decatur, Ill., District Meeting Postponed Until June 23.

It has been deemed advisable to postpone the district meeting and operators' school of the Illinois Independent Telephone Association, scheduled for Decatur, Ill., from June 16 to June 23. The meeting will be held at that time at the Orlando Hotel.

Trunk Telephone Line Connects Oregon National Forests.

A trunk telephone line, connecting all forest service lines on the Crater national forest in southern Oregon with the forest headquarters at Medford, has just been completed by forest service officers.

The line is said to be 23 miles in length and extends from Medford to Butte Falls. Each ranger on the national forests of this district during the summer fire season, according to C. M. Allen, telephone engineer of the local offices, will be equipped with a light portable telephone, enabling him to get in instant connection with the forest headquarters the minute occasion arises.

The "Strike" at Bloomfield, Neb.

Story of the Closing of the Telephone Exchange at Bloomfield, Nebraska, as Prepared by the Nebraska Telephone Association — Majority of Subscribers Kept in Ignorance of Real Happenings by Their "Committee"

So much interest has been stirred up by the telephone "strike" at Bloomfield, Neb., that TELEPHONY herewith presents the facts in this extraordinary case. There is no doubt the telephone company will win out in the end as it has right on its side.

Stubbornness and personal pride on the part of some of the Bloomfield business men have influenced them to continue the opposition, but it is gratifying to note that the majority of the subscribers realize they have been misled to array themselves against the law.

The Nebraska Telephone Association will see that the following history of the case is given wide publicity.

In the autumn of 1920 the Union Telephone Co., which operates exchanges at Bloomfield, Crofton and Wausa, applied to the Nebraska State Railway Commission for an increase of its service rates.

Up to this time there had been no increase in the company's rates since its organization in 1902, excepting that the rate for switching service was raised from 25 cents to 40 cents per month in 1919. The reason for requesting a raise in rates last Fall was that the operating revenues were no longer sufficient to cover the operating and maintenance expenses and provide a proper depreciation reserve.

When Increase Was Asked.

The increase would have been applied for sooner but for the fact that the company was rebuilding its Bloomfield plant, changing it from a grounded to a metallic system, and this had been completed and placed in operation before a rate for metallic service could be requested.

More than $30,000 was expended upon the rebuilding of the Bloomfield exchange. The central part of town was all cabled underground. The main reason for doing this was to improve the appearance of the main streets by removing the pole lines from them. There was no other practical way of doing this, owing to the peculiar way the alleys are laid out in the business section.

On December 7, 1920, a public hearing on the rate application was held before the railway commission at Wausa. The telephone patrons of both Bloomfield and Wausa were represented at the hearing by attorneys. At the close of the hearing Commissioner Browne told the Bloomfield and Wausa attorneys they might have 30 days in which to file further protests against the raise in rates, if they should think of any.

On February 28 the railway commission made its order granting and fixing the new rates, to take effect April 1. In its finding the commission says:

"The company has had a healthy growth in the past three years or it would have been impossible for it to have continued operating as it has or to secure relief by so modest an increase."

The Mass Meeting.

On the Sunday following the receipt of the order at Bloomfield from the railway commission, a mass meeting was held to discuss the matter and "to take the necessary steps to prevent the raise." The telephone company's representative was invited to stay away. It was decided that a petition be drawn up notifying the company that on the day the new rates were put into effect, the telephone service of the signers should be discontinued. A committee of three was appointed to circulate the petition.

The petition was thoroughly circulated, and by the end of March it had the signatures of about 650 of the 700 Bloomfield subscribers.

On the evening of March 30, another meeting of the telephone patrons was called by the president of the Commercial Club. It is reported that an electrician was consulted as to how each subscriber could disconnect his own telephone, so that all could get off in a body.

The next afternoon, March 31, at about 5:30, a certified copy of the petition instructing the telephone company to discontinue the service of the signers when it put into effect any part of the advanced rates, was presented to the company. The company was thus given about 6 1-2 hours' time in which to discontinue the service of about 650 subscribers. However, the subscribers beat the company to it, as on the following morning the manager found less than a dozen lines working.

Evidently most of the subscribers were ignorant of the fact that the rates fixed by the railway commission are law, and the telephone company has no other choice than to charge those rates. Hence it appears they assumed that if a sufficient number ordered their service discontinued, the company would not attempt to place the advanced rates into effect. As a local paper puts it: "All were for taking necessary steps to prevent the company from enforcing or collecting the same."

The Platte County Independent Telephone Co. has experienced unpleasant results from not charging the rates ordered by the railway commission. To quote the Omaha Bee: "The commission granted a small increase, but not as much as the company wanted. The company refused to charge the rates ordered by the commission and a petition for mandamus against the company was filed in the Platte county district court by the commission."

On Sunday following the discontinuing of the telephone service, a committee of Bloomfield business men drove down to Lincoln. On Monday they had an all-day session with the railway commission, and presumably received some education, as they are reported to have repeatedly asked that a member of the commission go up to Bloomfield and explain the matter to their people. The commission is reported to have told the committee to go home and explain it. But one of the party is said to have replied that he could not do it.

The following Thursday the manager of the telephone company published in both the local papers at Bloomfield a letter received by him from Chairman Taylor of the railway commission, informing him that the company had no other choice than to charge the rates as prescribed by the commission.

Subscribers Ignorant of Law.

Expressions of wonder that the committee which had gone down to Lincoln did not call a meeting and report, were soon heard among the telephone patrons. And patrons began to express a desire to have their service restored—and they were willing to pay the rates. It was claimed, in some cases, that the amount of the raise had been misrepresented. However, the great obstacle to coming back seemed to be that no one would be first.

In order to help the patrons to get around this, the company devised a plan to circulate a petition for the signatures of the patrons who desired to have their service restored, but not to be effective until signed by 50 farmers and 25 town patrons.

Before starting to circulate this petition, the company conferred with the committee representing the patrons, laying before the committee the details of the plan. The committee appeared favorable to the plan and promised they would place no hindrance in its way. However, the circulation of the petition had barely commenced when cards were sent broadcast by the "committee," calling a telephone meeting for the following Friday evening, April 29. Of course, that killed the plan for restoring the service.

At that meeting the committee submitted a report of its conference with the

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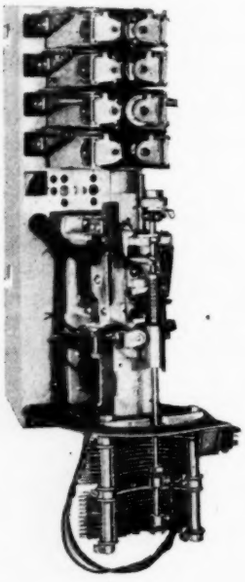

In Strowger exchanges of every size, in every part of the world, this type of switch is taking the place of the operator in setting up and releasing telephone connections.

Modified to fit the conditions of your plant and the service requirements of your community, such equipment will eliminate all local operating expense; and the rapid, accurate and continuous service it gives will secure the public support so essential to continued prosperity.

Strowger Automatic telephone instruments similar to this are serving the patrons of exchanges of every type and under every conceivable condition of operation.

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For City Systems—Single or multi-office. Strowger Equipment meets every requirement; for individual, party line or P. B. X. trunk service; for flat or measured service rates (prepayment or metered).

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LCTRIC COMPANY

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railway commission. The tenor of its report is indicated by the fact that a resolution was moved and adopted giving the telephone company 30 days in which to restore the old rates, and besides, provided that free service to the county seat should be given. And the telephone patrons were admonished to stick together.

As a last straw, it is held out that the franchise was obtained under misrepresentations. The absurd contention is that the company "asked and required that the franchise contain a clause that provided a maximum rate of $2.50 for business telephones and $1.75 for residence telephones," and that this franchise was granted on the company's faithful promise that the rates granted therein would never be charged.

One of the local papers has been very active in spreading propaganda, often well stimulated with misrepresentations, such as: that the Bloomfield patrons have been discriminated against in rate charges year in and year out; also that after securing the new franchise, the company immediately applied for, and the commission granted, the full maximum rate charge.

As a matter of fact it was more than a year from the granting of the franchise until the rates were advanced—and they were not advanced to the maximum granted in the franchise, excepting on the business telephones, a comparatively small number. It is presumed that if the telephone is not worth $2.50 and more a month to business, that business is not in need of a telephone.

The paper also intimated that the railway commission would not give ear to the people's side of the case—after the commission had given their committee a whole day of their time. Had the committee gone home and straightway reported the information they received from the commission, no doubt the whole matter would have been settled with very little delay.

The company having been effectively blocked in its endeavor to restore service to its patrons, and finding that its gross income at Bloomfield was not sufficient to cover operating expenses alone, authority was received from the railway commission to close the exchange. This was done May 18.

GOSSIP

By Miss Anne Barnes

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa.

Webster defines gossip as: scandal; a babbler; to tattle.

His analysis of scandal is: first, defamation, or to vilify; second, disgrace, meaning shame and dishonor for some one.

By babble he means a confused murmur of sounds.

He says to tattle is to talk idly, triflingly, tell tales and secrets.

When a thing happens which is a disgrace and dishonor to people we know, or know through other people, it does not become scandal until the town gossips reconstruct the facts and present them with their own personal opinions of the person in trouble. Who are the town gossips? Any one who repeats a story which is of a destructive nature.

The way to know you are in the presence of the enemy is when someone tattles, talks idly, triflingly, tells tales and secrets of another to you.

My definition of gossip is: Whenever a person has something harmful to say of another, when she *tells* it, she *hopes* it is true.

If you doubt this as she finishes her story, *you* say, "I don't believe it." She usually falls into the trap saying: "Oh, I know it is true. I will tell you why." etc.

Three women sat on the train across the aisle from me recently. Their voices all ran together in a confused babble. Finally my attention was arrested by one voice with smooth insinuating notes. She was saying: "Poor dear Mrs. Brown, I do hope it is not *all* true, although it came straight to me by a neighbor who saw it with her *own* eyes.

"Let me see—it was last Thursday, or was it Tuesday? Yes, it was last Tuesday as I had planned to bake a cake when the telephone rang and Mrs. Brooks told me confidentially all about it. She had more to tell me but someone kept butting in on the line. Aren't these party lines dreadful?"

This accuracy of detail helped to make the story more plausible.

Then they all babbled together. Each had a story and a version. They put their heads together and something like this floated across the aisle: "I have heard," "I understand," "You know they say," "She said to me" and "I told her," and"You must not repeat it to a soul as it may not be true," "You are the only ones I have told," "Please don't quote me."

The train came to a stop and they all got off.

Utility Investments and Commission Control.

Speaking before the Western Efficiency Society, J. C. Johnson, vice-president of the Great Lakes Trust Co., of Chicago. paid a compliment to public utility securities as safe investments and commended state regulation as a big help to business. He said in part:

"Investors for the past decade have looked with favor upon public utilities securities as an avenue of safe and sound investment. These securities have been eagerly purchased by individual investors, banks and insurance companies. They are largely held by small banks in the smaller communities.

"One reason why the country has looked with extreme favor upon this class of securities during the past ten years or so has been that they have been regarded as stable investments because of the excellent system of public utilities' regulation by commissions now in vogue in almost all of the states. These commissions have worked well, not only in the interests of the holders of the securities, but of the people also, as they have made for better service and usually for lower rates—always for the lowest rates consistent with good service.

"Any disturbance of this system of regulation would be a calamity that would be quickly felt in the business world. For one thing, it would mean poorer service, and business today demands the highest possible character of service from the public utilities. That is a very grave consideration. There is no question of the fact that the old time political control of public utilities resulted in far poorer service than we have now.

Commission regulation has brought about distinct service betterment, and has therefore been a strong factor for promoting general prosperity.

"Every other method of dealing with the utilities has broken down. It has been shown by bitter experience that they cannot be effectively regulated and controlled either by municipalities or legislatures. In either case this has invariably meant political control, with its attendant evils of graft and slipshod methods.

The present demagogic cry in factional political circles for the discarding of our admirable utilities law in Illinois is dangerous and should be rebuked. The overthrow of the commission would mean the jeopardizing of millions of dollars of securities widely held throughout the state; poor service; graft and blackmail; and all the evils which in the past have beset public utilities and caused scandal in the political affairs of the state. That is one political effect upon business which should be reviewed with distinct apprehension if the cry—which I cannot but believe to be a manufactured one—for the abolition of the public utilities commission should prevail."

The Telephone and the Investor

Final of Series of Articles Telling Why the Telephone as Investment Proposition Has More Good Features and More Favorable Points Than Other Commercial Lines—Record of Telephony Compared with Other Lines of Business

By "Observer"

In all records of business enterprises in this country, the telephone stands far and away ahead of all. In the history of the United States, we have examples of thousands of enterprises which, from small beginnings, have grown to enormous propositions.

The majority of these have had periods of great prosperity and corresponding periods of depression.

Enormous plants have been erected which in a few years have been abandoned for different styles of construction and often at a cost for the change that has crippled the owners and has been a large contributing cause in their final downfall.

Large profits at certain stages in the development of new enterprises have attracted capital to invest in large and small enterprises in the same line.

Continued increase in the number of parties prosecuting these enterprises soon brought competition, excessive in its character. The weaker were crowded to the wall and the stronger finally tried to organize a trust. In many cases such combinations, illegal as they are, were yet unable to weather the storm.

The community of interest in a trust was the result of fear on the part of the members of the trust. They could not meet competition apart and were able to maintain their position collectively, in most cases, only by illegal combinations.

Public opinion is always aroused at the former natural tendency of a trust or monopoly to ride rough-shod over the people when they felt themselves able to do so. Then came the natural result of hostile legislation disturbing the whole fabric—likely to make the last condition worse than the first.

While this has not been the history of all business enterprises, in this country, to be sure, yet it has been the record of a large number, and sufficiently large to cause the careful investor to consider very carefully the character of the enterprise that seeks his money for investment.

What was the record of the Independent telephone movement during the first 15 years of its development? It was the means of preventing a restrictive monopoly, and of bringing the benefits of telephone service to every nook and corner of the country.

It placed telephone service on such a business plane that it is now practically impossible to supply the demand for service.

There are fully 8,000 Independent commercial telephone companies throughout the United States with millions of satisfied and grateful subscribers. No business proposition ever had such an army of people financially supporting the movement all over the country.

Practically every Independent telephone subscriber is a loyal supporter of the company from which he receives his telephone service.

Every Independent telephone investor from the Great Lakes to the Gulf and from the Atlantic to the Pacific is interested in and striving for the prosperity of his own Independent telephone interests, and at the same time is equally anxious for the success of the telephone movement over the entire country.

In all the history of business since the world began, there had never been any movement of a like character. The Independent telephone development swept like a tidal wave over this country.

The big companies help the smaller organizations and every one, great and small in the telephone field, is simply steadily building up the greatest business aggregation ever known.

The Independent telephone has been the greatest business accelerator ever known—by it, a man's ability "to do things" has been increased to a degree that can hardly be computed.

Before the Independent telephone movement was inaugurated, the telephone under monopoly was not in great general use. Today, millions of people who under monopoly never dreamed of having a telephone, are using it and increasing their business capacity, by saving in time, to an enormous degree.

A business errand that in a city would take hours of time to transact by the use of the trolley, is by the telephone transacted in a minute. Under such conditions, the saving in time cannot be computed.

With these facts so plain and with business men practically agreed that business, as done today, could not be carried on without the telephone—is there any line of commercial activity that can be suggested which is better from an investment standpoint than the securities of honestly-organized and honestly and intelligently-operated telephone plants?

There is practically no other line of business, whatever its character, aside from the telephone, whose product or service cannot be performed in some other way or by using some other article of manufacture.

If you would speak to another not in your immediate presence, it can be done only by means of the telephone. It can be done in no other way—and no service can be offered that will take the place of the telephone.

A SUMMING UP.

We have much upon which to congratulate ourselves. Our difficulties are infinitely less than those of Europe; we have weathered the danger point of a great crisis; our financial system has proved its strength and for the first time we have passed safely through a commodity crisis without monetary panic. Our people have abundant food and abundant clothing. We are at least warmly housed, even though crowded.

We possess in the high intelligence, high courage, and high ideals for our people, ample reserves of economic, social, and political strength. We possess a great sense of neighborliness that has had fine manifestation in these difficult months in help given each other for weathering the storm. We have had a remarkably small ratio of failures.—Herbert Hoover.

Illinois Bell Authorized to Increase Stock $10,000,000.

Directors of the Illinois Bell Telephone Co. called a special meeting of stockholders which was held June 15 at which an increase in capital stock from $40,000,000 to $50,000,000 was authorized.

The $10,000,000 new stock is to be offered to stockholders at par, proceeds to be used for retiring loans by local banks and the American Telephone & Telegraph Co., and also to pay for additions to its plant already made and for this year's construction program.

Oregon Forest Telephone Lines to Be Extended.

Before the beginning of the fire season, it is planned to have the Malheur and Ochoco (Ore.) forest service districts connected by a government telephone system. By building about 50 miles of additional line, the two districts will be connected.

This will be of great assistance in locating and reporting fires throughout the territory, and will enable the establishing of three new lookout stations in the Malheur reserve and one in the Ochoco.

What Is Your Company Doing?

Chats About Company's Doings.

By Stanley R. Edwards.

"Your average customer is the man you see everywhere," said Harford Powel, Jr., editor of Collier's, in an address on "Contact with People," at the recent convention of the National Electric Light Association, held in Chicago. "He is the man that called this service into existence, and he is the man that the industry serves. People used to think they were getting along well with candles, but the electrical industry has taught the average customer different. Now the industry knows that it is only a matter of telling the average man about the many things that are available, for him to want them.

"There are about 5,000,000 unwired houses within reach of existing electric lines. Giving service to this great array of prospective customers requires such an outlay of money that there is only one place from where it can come—the savings of the public.

"The industry has gotten beyond the stage of conducting an advertising campaign; a campaign is entirely too limited to serve the needs. The effects of a campaign do not last and if the public is made to continue to understand the problems of the industry, the public must be reminded continuously of those problems.

"The average man is the individual who makes or breaks any enterprise, and it is the individual, not the public, that must be catered to. The clerks who meet the customers of the company are the symbols of the company, and they have a vast influence on the impressions that the public gain of the company. The question of satisfying existing customers is vastly more important than attracting new customers."

Mr. Powel's comments apply equally well to the telephone. When it comes to acquaintance with the average man, the telephone woman or man can relate many things about him, knowledge gained from intimate day-to-day contact.

C. E. Wells, general manager of the Hillsboro Telephone Co., Hillsboro, Ore., recently met with an accident which he claims to have been caused literally by his sitting on the end of a limb and then proceeding to saw off the limb.

Mr. Wells had climbed a pole and carefully adjusted his safety belt before beginning to shave off the pole's top. Things were progressing merrily until the second or third stroke of his drawing knife cut through his safety belt, dropping Mr. Wells via the summersault route to the ground below where he landed on his feet. A fractured bone in one leg resulted and he is now on crutches and explaining how it happened.

As a result of the publication of the accompanying advertisement in a local daily, and several short locals, 800 people,

Please Come to Our Party———

TELEPHONE SERVICE is an important factor in the industrial business and social life of every American community. While the mechanical and electrical elements form a necessary foundation for service, the human element is the most important—and that element enters into every telephone conversation at both ends as well as in making the connection.

There are no mysteries in good service. There are no secrets of operation. The very best telephone service is founded on "desire to serve," and in order to bring about an intelligent understanding of our operating problems, we would like to meet you face to face at our central office at the Telephone Building on Thursday, May 19, either afternoon or evening, and show you how nicely we are equipped to take care of the telephonic needs of this community.

It will take only a few minutes of your time, and we feel that we can assure you that it will be interesting. Please come any way, so that we may become better acquainted with you.

Cordially yours,

THE LINCOLN TELEPHONE & TELEGRAPH COMPANY

The Invitation That Brought the Crowd.

including some high school students, visited the Telephone Building in Beatrice, Neb. Punch was served and roses were given to the ladies and souvenir lead pencils to the gentlemen visitors.

"All seemed well entertained and glad they came," says W. H. Caman, district commercial manager of the Lincoln Telephone & Telegraph Co. The original advertisement occupied two columns and the result demonstrates again that "advertising pays."

Members of the Inland Press Association at a recent convention in Chicago inaugurated a constructive program of co-operating with the telephone companies serving their localities. H. F. Crunden, speaking before the newspaper men on the subject "What Can the Newspapers Do to Help the Telephone Companies?" said:

"The telephone utility is a community proposition. It is not an ordinary commercial business, for it cannot add overhead and profit and sell its wares as can other business. It is dependent upon the public to provide the facilities to give it service which it needs at rates over which the utility has no control. Nearly all the revenue received is again disbursed through numerous public channels of industry and labor, directly or indirectly, back to those who pay for the service.

"To maintain the telephone system, the company must first obtain capital from the public; it must buy material in the open market at open prices; it must assemble the raw material into a telephone plant and then bury it in the earth or string it on points. Unwarranted adverse criticism is detrimental to best public interest. The securities of the utility should be sought after as a solid, substantial investment and its earning capacity assured beyond any question of doubt so that it can meet the community's needs and progress with it."

"It pays to co-operate," says H. E. Bradley, president of the Pennsylvania State Telephone & Traffic Association, in a recent letter sent out to the Pennsylvania companies. In it he says:

"During the past two weeks we have had three very pleasant surprises and just because there is a little lesson connected with each, we are passing them on to you.

First, the bureau of rates and tariffs of the Pennsylvania Public Service Commission requested samples of some of the tariffs we have prepared and filed for our companies, stating that they wished to have them on hand to exhibit as examples of 'how a tariff should be prepared.' This we consider a very great compliment, and it is due entirely to the care which has been used in following closely the wishes of the bureau that our tariffs have reached this state of perfection. We can relieve you of a great deal of trouble and worry in the preparing and filing of tariffs and you have the added satisfaction of knowing that they will be acceptable to the bureau when presented.

Second, E. M. Prisk, vice president and general manager of the Consolidated Telephone Co. took the time from one of his busy days to write a very nice letter complimenting us upon the fact that not one

of the many bills objectional to telephone companies passed the last session of the legislature. While this was not due entirely to our individual efforts, but was accomplished by co-operation, not only among our own members but with other public utility organizations, it is pleasant to feel that at least one company is appreciative and does not hesitate to say so.

Third, M. H. Murphy, president of the Bradford County Telephone Co. also found time to write and compliment us upon the fact that our April settlement was completed and in the hands of our members on June 1. Had it not been for a holiday it would have been out a day sooner. There is no reason why every settlement should not be out as promptly, if the companies would only send their reports in as soon after the 20th as possible.

Every month we are compelled to write certain companies to send in their reports. Is your company one of these? If so, you are causing us unnecessary trouble and expense and holding up our work. Some one in your organization is responsible for the preparing of our report; why not have it understood, right now, that it is to be in our hands by the tenth of the month. Find out if your report is in, when it went in, or if not in why not.

Have you found the three little lessons? They are all the same, just three more examples of what can be accomplished by co-operation."

About 20 girls in Professor O. C. Osborn's class in physics at the South Bend high school were shown through the Indiana Bell Telephone Co.'s building in South Bend, recently. The class of household physics, which has recently taken up the study of electromagnets and telephone systems, was taken through the building in order that the students might see the workings of the telephone in connection with their classwork.

The class was shown the registering of calls at the office and demonstrations were made of calls, tracing them from the start to the final connection. Equipment was shown which makes it possible for the conversations which are held daily over the 12,000 telephones located in South Bend. Over 15,000 calls are made over the 2,000 telephones in Mishawaka daily, making a total of about 95,000 conversations in South Bend and Mishawaka each day. In South Bend there are about 1,000 toll calls going out daily and about the same number coming in.

The girls were guests of the company at a luncheon in the cafeteria of the telephone building following the tour and demonstration.

The Tri-State Telephone & Telegraph Co., St. Paul, Minn., scored a hit with an attractive and distinctive piece of advertising that appeared in an industrial parade in St. Paul, May 28.

Taking a battered and workworn construction truck that had never borne anything more beautiful than a gang of groundmen and linemen, an artistic employe of the company transformed it into a veritable open-top limousine, bearing a P. B. X. board and one of the company's prettiest operators.

With white cloth, the truck was draped from radiator to tail-light. Over this, were pinned paper poppies, the flower symbolical of Memorial Day, which were being sold in St. Paul that day to aid war veterans.

Panel signs bearing the name of the company covered both sides of the truck. On each stake, an automatic telephone appeared, connected to the P. B. X. board with white ribbons. The wheels were camouflaged with white disks having poppies painted on them. Like a queen on her throne sat the attractive operator

"A Hit" Was Scored by the Tri-State in a Recent Industrial Parade.

adding a touch of realism to the symbol of service.

The occasion of the parade was the celebration by the Midway Club of St. Paul of the opening of a five-mile "white way" on University Avenue, St. Paul's famous industrial highway.

It was a significant participation by the Tri-State company, as it was in Merriam Park of the Midway district that the company's first office was established, 20 years ago. The general offices were located there until a year ago when they were moved into the downtown district.

A recent issue of the Clay County News, published at Liberty, Mo., discusses public utilities from an investment standpoint. Under the heading "Investing in Public Utilities," it says:

"There is a popular wave of enthusiasm all over the civilized world now for public utilities as an investment by the common people.

Why it is popular, one can easily see. In the first place, men of money have come more and more to realize that value of co-operating with the people from whom they expect to make their additional millions—that it pays to 'go in with the people' and to get the people to go in with them and share with them in the profits.

The capitalist has found that he must share his profits with the people if he expects his own investment to pay large dividends; he must have the good will and co-operation of the people. His money alone cannot assure him success.

Times are changing. A rich, foreign man cannot come into a town these days and invest his capital in public utilities and feel as secure as he used to, without taking the home folks into his schemes, thus securing their sympathetic co-operation to make a success. So he comes now and says to a town or city or community: 'I will build your telephone or electric plant, but I want you to have a part in the cost and an equal share in the profits.'

All business men know that an investment in public utilities is safe because it is protected by the city, county and state; and moreover, the utility itself is back of the investment. They know, too, that panics do not paralyze public utilities—necessities of life. And then when you buy a share of such stock in Missouri, it is free from state taxes and the normal federal income tax. Better still, you can invest in almost any utility today and be guaranteed 7 or 8 per cent dividends and there will be no question about getting it.

No wonder the country is awakened on this proposition."

Commissions, Courts and Councils

Discussion and Rulings of State Bodies Having Supervision Over Telephone Companies—Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchise, Rates and Service

Classification of Residence Telephones of Physicians.

As the result of a petition filed by the Somerville Medical Society in the matter of the application to doctors of medicine, under certain circumstances, of the business classifications by the New England Telephone & Telegraph Co., the Massachusetts Department of Public Utilities handed down a decision on June 3 specifying when and when not a physician must pay the business rate for a telephone in his residence.

According to the order, when a doctor of medicine desires the word "physician" inserted after his name in the company's directory, the company is to infer that the use of the physician's telephone is primarily for occupational purposes and is to bill him at the business rate.

A doctor of medicine, on the other hand, who does not desire the word "physician" after his name, but is satisfied with the insertion of the abbreviation "Dr." is to pay business rates only if he admits that the use of the telephone at his residence is primarily for occupational purposes, or if he does not concede this fact, but the evidence clearly indicates that that is the primary or chief use to which his telephone is being put. Where, however, the use of his residence telephone is primarily for social or domestic purposes, the doctor is bound to only residential rates.

In its "commercial practices" the company provides that residence rates permit the use of the service for social or domestic purposes only, while the use of service by physicians who have one main station only is to be considered as being used primarily for business purposes, and therefore should be billed at the business rate. The commission was opposed to this method of distinction.

At the hearing it was argued by the petitioners that the practice of medicine was not a business. This, the commission stated, would undoubtedly be true if the question at issue was the difference between business and professional use. Inasmuch as the word "business" in this instance is to apply to any occupation by which livelihoods are made and the practice of medicine is the method through which most doctors earn their living, the practice of medicine is considered as a business.

Some emphasis was put by the petitioners upon the fact that most of the use of doctors' telephone service is made not by the doctor calling up a patient, but by the patient seeking the advice or assistance of the doctor, so that most of the calls were inward calls.

This, the commission declared, is true with many commercial houses which pay large rents, not so much to enable them to be in a good position to call upon their customers as to be readily accessible themselves to the demand of those who wish to deal with them, the same being undoubtedly true of the use of the telephone by many commercial concerns.

The petitioners contended that the word "doctor" was not only a designation of an occupation but also a title, to which the company acquiesced and agreed that in the future the abbreviation "Dr." may appear in the telephone directory after a doctor's name, without indicating that the use of the telephone at his residence is primarily occupational.

The company declared, however, that the use of the word "physician" is a description of occupation and consequently that where this word is used, the service should be treated as primarily occupational service.

Order Telephones Taken Out When Rates Are Raised.

Farmers who ordered their telephones out rather than pay an additional $3 a year rental charged by the Mount Albert Telephone Co., of Mount Albert, Ont., Canada, will be given several days to reconsider their decision, according to a recent report.

After a conference with Francis Dagger, telephone expert of the Ontario Railway & Municipal Board, the company decided not to make the increase effective until August 1. The present yearly rental is $12 and the new rate sanctioned by the railway board is $15.

Since the company was first organized, 15 years ago, the annual rental has remained unchanged. Rather than pay the extra rate nearly 100 subscribers had notified the company to remove their telephones.

Asks That Telephone Company Be Compelled to Supply Service.

The Illinois Bell Telephone Co. has been made defendant in one of the superior courts in Gary, Ind., in a suit filed by Charles Pitzele of East Chicago. Mr. Pitzele has filed a petition for a writ of mandate to compel the company to install a telephone in his East Chicago home. The case has been venued to Porter county.

In his petition Pitzele declares that he made application for a two-party telephone on May 21, and the application was turned down. He says he then tendered $2.75, the regular monthly payment rate as fixed by the state public service commission and demanded a telephone. This likewise failed.

The company contends that Pitzele must pay business rates because his place of business and his home are all under one roof.

Hayfield (Minn.) Telephone Co. Gets Rate Increase.

Authority to increase its local and rural rates was granted the Hayfield Telephone Co. by the Minnesota Railroad & Warehouse Commission on June 10. The old and new net monthly rates follow:

Individual line business.....	$1.50	$2.25
Individual line residence.....	1.00	1.50
Extension stations, business or residence	.50	.50
Rural multi-party, metallic circuit	1.00	1.50
Rural multi-party, grounded circuit	1.00	1.25
Rural switching charge.....	...	.35

Approximately 171 town and 160 rural stations are served by the Hayfield Telephone Co. at Hayfield. In addition the company performs switching service for 40 rural connecting stations.

New Franchise Offered Pike County (Ill.) Company.

A special meeting of the Pittsfield, Ill., City Council was held recently at which it was voted to give the Pike County Telephone Co. a 30-year franchise to operate a telephone system in Pittsfield, provided it will agree to have all wires under ground within five years.

The company's present franchise runs for 12 years yet, which time is to be included in the new franchise.

Rates and Connection Charges for Minnesota Company.

In an order issued June 10 the Minnesota Railroad & Warehouse Commission authorized the Midland Telephone Co. to increase its local and rural rates at Adrian and Ellsworth and to establish service connection and other miscellaneous charges. Here are the old and new net monthly rates and the service connection charges which will become effective July 1:

Individual line business.....	$2.00	$2.25
Individual line residence.....	1.00	1.50
Four-party line residence....	...	1.25
Rural multi-party, metallic..	1.25	1.50
Rural multi-party, grounded.	1.25	1.25
Extension, business	1.00	1.00

Extension, residence	.50	.50
Extension bells	...	.25
Rural switching	.25	.35

(With a minimum of five stations per circuit.)

	Service Connection Charges.		
	Business stations.	Residence stations.	Extension stations.
Instrument not in place	$2.00	$1.50	$1.00
Instrument in place	1.50	1.00	No charge

At the hearing representatives of several rural companies were present and objected to an increase in the switching rate. No evidence was offered, however, as to the cost of performing this class of service and the commission's study of the cost of switching connecting companies indicated that the switching rates petitioned for were not unreasonable.

The Midland Telephone Co. is a corporation with its principal place of business at Adrian. It also operates a system of toll lines connecting with towns in the immediate vicinity.

Service Unsatisfactory—Rates Increased Temporarily.

A temporary increase in rates was granted the Home Telephone Co., of Joplin, Mo., for its Purcell exchange by the state public service commission on May 24 to become effective July 1. The new annual rates, which are to remain in effect for 13 months, compare with the old as follows:

	Old.	New.
Single line business	$36	$36
Four-party line business (For thinly settled districts.)	24	30
Eight-party line business (Outside city limits.)	24	30
Single line residence	30	30
Four-party line residence (For thinly settled districts.)	18	21
Eight-party line residence (Outside city limits.)	18	21
Extension gongs	..	6
Extension bells	3	3
Intercommunicating systems:		
Trunks	30	36
Answering stations	..	39
Stations	15	30
Rural:		
subscriber owns equipment	4	6

The rates allowed are somewhat lower than those asked for by the company, the commission having received a letter from the mayor stating that the patrons and members of the city council had no objection to the increase in residence rates, but that they considered the other increases asked for to be excessive.

The letter stated further that the service rendered was unsatisfactory and that if the company needed more money to improve it, the city council and patrons were willing that a reasonable increase be allowed. As compared with rates allowed companies in other towns, operating under similar conditions, the commission found the proposed rates to be excessive.

In its order the commission said that the rates allowed will not furnish an adequate rate of return and that the company will be compelled to reorganize its forces or find some other way of increasing its revenues before it will receive enough revenue to pay the actual operating expenses, the conditions surrounding the exchange being responsible.

Approximately 125 subscribers are furnished service from this exchange. The company furnishes a local battery, metallic line service to all of its subscribers, with metallic trunk lines to its adjoining exchanges.

Bell Company Asks Rehearing in Missouri Rate Case.

Attorneys for the Southwestern Bell Telephone Co. filed a motion for rehearing in the Missouri Supreme Court on June 2 in a controversy wherein the court upheld the state public service commission in refusing to grant the company increases in rates in St. Louis and other Missouri cities, and forbidding the company to charge an additional cost of $3.50 for installing and changing telephones.

The motion is based largely on the contention that the commission did not give the company a fair valuation when it fixed the property at $20,400,000, and that it is entitled to the charges for installation and changing telephones. The company contends that it will have to pay out $25,000,000 within the next five years in improving its property in Missouri.

Asks Authority to Continue 10 Per Cent Surcharge Indefinitely.

The Northwestern Bell Telephone Co., which took over the Nebraska Telephone Co. on December 31 last, has filed with the Nebraska Railway Commission an application asking that the surcharge of 10 per cent which, for a period of seven months ending July 1, 1921, it has been permitted to add to all exchange service bills, be continued.

In addition it asks that it be permitted to increase the differential between station-to-station and person-to-person calls from 25 to 40 per cent, and that between station-to-station and appointment and messenger charge 70 per cent. The company desires that the report charge be fixed at the difference between the station-to-station and the person-to-person charge. It had asked this months ago, but no ruling was ever made by the commission.

The new schedule of toll rates thus proposed for calls within the state is changed somewhat so far as the mileage basis divisions are concerned, and on station-to-station calls there will be no increase in rates until 50 miles is reached, and from there on the new rate is 5 cents a call additional. No increase in the short distance toll calls when a specific person is asked for is listed, but at 15 miles, it jumps 5 cents; at 50 miles, it is 15 cents more; at 100 miles, 25; 200, 40 cents; and 300, 80 cents.

The proposed rate increase for station-to-station calls follows:

Mileage.	Present.	New.
10	$0.10	$0.10
15	.15	.15
20	.20	.20
25	.25	.25
50	.40	.45
75	.55	.60
100	.70	.75
150	1.00	1.05
200	1.30	1.35
300	1.95	2.00

The proposed increase in person-to-person calls is as follows:

Mileage.	Present.	New.
10	$0.20	$0.20
15	.20	.25
20	.25	.30
25	.30	.35
50	.50	.65
75	.65	.85
100	.85	1.10
150	1.25	1.45
200	1.60	2.00
300	2.40	3.20

These rates are those put in effect during government control and represented at the time an entirely new method of building up rate schedules, with charges more nearly corresponding to the value and difference in the service. The company sets up in its application that the present rate schedules are allowing earnings of but 5 per cent on the actual value of the $24,000,000 worth of property it operates in Nebraska, its net for the first four months of the present year being but $218,775.60. At the same time it is paying 7½ per cent interest at the banks for necessary borrowings.

The balance sheet of the company is attached to the application for proof of its claim that the present exchange rates must continue indefinitely and that a greater toll revenue is desirable. Last year its exchange revenues were $3,243,083 and its toll revenues, $1,289,592, a total of $4,532,675. Expenses totaled $4,092,064, leaving net profits of $409,217. It paid dividends of $770,000, leaving a deficit of $360,783, which came out of surplus. The company operates 103,772 stations in Nebraska and has connections with 179,438 more. Its average revenue per station per month is $3.77.

The detailed schedule which the Bell officials ask Nebraska to adopt has been worked out with great care, and they believe it represents the true balance between the various classes of service. It follows:

Mileage.	Station-to-Station.	Person-to-Person.	Appointment and Messenger.	Report.
0- 10	$0.10	$0.20	$0.25	$0.10
10- 16	.15	.25	.30	.10
16- 22	.20	.30	.35	.10
22- 28	.25	.35	.45	.10
28- 34	.30	.40	.50	.10

Company.	Town or City.	Population.	Total No. telephones.	Type of equipment.	Net rate per annum: 1-party business.	2-party business.	1-party residence.	2-party residence.	4-party residence.	Rural business.	Rural residence.	Rural switching.
Republican Valley, Neb.	Franklin	949	546	Mag. and C. B.	$33.00[1]	$.....	$24.00[1]	$.....	$.....	$.....	$.....	$.....
					24.00[2]	.....	18.00[2]	.....	21.00[1]	.....	18.00[2]	.....
Hanover Rural, Minn.	Rockford	287	255	Mag.	27.00	.....	18.00	.....	.....	.....	18.00[1]	.....
	Hamel	150									15.00[2]	6.00
	Hanover	267										
Deshler Farmers Mut., Ohio	Napoleon	4,007	...	Mag.	21.00	.....	15.00	.....	12.00[3]	.....	18.00	.....
Limestone, W. Va.	Lewisburg	803	...	Mag.	42.00[1]	36.00[1]	36.00[1]	30.00[1]	.....	.....	.....	.....
					36.00[2]	30.00[2]	30.00[2]	24.00[2]	.....	.....	.....	.....
Kennedy, Minn.	Kennedy	232	192	Mag.	27.00	.....	18.00	.....	.....	.....	18.00	.....
Argyle, Minn.	Argyle	744	382	Mag.	30.00	.....	18.00	15.00	.....	.....	18.00	4.20
Buchanan Co. Mut., Mo.	De Kalb	391	...	Mag.	20.00*	.....	18.00*	.....	.....	30.00[4]	18.00[4]	.....
										27.00[5]	15.00[5]	.....
Campbell, Nebr.	Campbell	573	352	Mag.	24.00	21.00	18.00	.....	16.80	.....	16.80	.....
Peoples, S. Dak.	Roswell	150	128	Mag.	27.00*	.....	18.00*	.....	.....	.....	16.80*	2.50
	Canova	318	153									
Hammondsport, N. Y.	Hammondsport	1,560	...	C. B.	36.00	24.00	18.00	.....	.....	.....	.....	.....
Utica Farmers Mut., Wis.	Gays Mills	557	...	Mag.	24.00	.....	15.00	.....	.....	.....	.....	.....
Morris, Wis.	Bowler	250	37	Mag.	27.00	.....	21.00	.....	.....	21.00	18.00	.....
Necedah, Wis.	Necedah	1,054	...	Mag.	31.80	28.80	19.80	16.80	.....	.....	.....	5.00
Crawford Co. Farmers Mut., Wis.	Petersburg	62	...	Mag.	24.00	.....	15.00	.....	.....	.....	.....	.....
Edgar, Local, Wis.	Edgar	746	99	Mag.	24.00	.....	16.20	.....	.....	.....	.....	.....
Kahoka, Mo.	Kahoka	1,758	...	Mag.	24.00*	.....	18.00*	.....	.....	.....	.....	.....
Herman, Nebr.	Herman	345	383	Mag.	24.00*	21.00*	21.00*	18.00*	.....	.....	16.80*	.....
Valley Springs, S. Dak.	Valley Springs	372	106	Mag.	24.00*	.....	18.00*	15.00*	.....	.....	16.80*	.....
Plymouth, Wis.	Plymouth	3,094	622	Mag.	30.00	24.00	21.00	18.00	15.00	.....	.....	6.00
Barton Rural, Wis.	Barton	448	18	Mag.	60.00	.....	.....	.....	15.00	.....	.....	.....
Farmers and Merchants, Minn.	Le Sueur	1,755	752	Mag.	30.00	.....	18.00	15.00	.....	.....	18.00	4.20
Lake Park, Minn.	Lake Forest	740	423	Mag.	18.00	15.00	15.00	12.00	9.00	.....	12.00	.....
					27.00*	24.00*	18.00[1]*	16.80[1]*	.....	.....	16.20*	.....
Nuckolls Co. Indept., Nebr.	Nelson	978	...	Mag.			16.80					
	Rusken	339	...		27.00*	.....	18.60*	.....	.....	.....	15.00*	6.00*
	Oak	237	...									
	Angus	250	...									
	Nora	250	...		18.00	.....	15.00	.....	.....	.....	15.00	.....
Jamestown, N. Y.	Jamestown	37,431	7,279	Mag. and C. B.	133.33	93.33	60.00	46.66	40.00	53.33	33.33	.....
	Celeron	720										
	Falconer	2,342										
	Lakewood	702			93.33	.....	46.66	40.00	33.33	50.00	33.33	.....
Grand Ronde, Ore.	Grande Ronde	60	42	Mag.	30.00	.....	24.00	.....	15.00	.....	.....	6.00
Montrose, S. Dak.	Montrose	552	126	Mag.	27.00*	.....	15.00*	.....	.....	.....	16.80*	.....

*Desk sets $3 per year extra.
[1]Metallic circuit.
[2]Grounded circuit.
[3]Six-party lines.
[4]Class B service.
[5]Class D service.

New Rate Schedules Approved by Various Public Utility Commissions and Published in "Telephony" During May.

34- 40	.35	.50	.60	.15
40- 48	.40	.55	.70	.15
48- 56	.45	.65	.75	.20
56- 64	.50	.70	.85	.20
64- 72	.55	.75	.95	.20
72- 80	.60	.85	1.00	.25
80- 88	.65	.90	1.10	.25
88- 96	.70	1.00	1.20	.30
96-104	.75	1.05	1.30	.30
104-112	.80	1.10	1.35	.30
112-120	.85	1.20	1.45	.35

Five cents added thereafter for every eight miles, nickels to be basis, with drop or advance as mileage brings below 3 or above 2 cents.

Hold Hearing on Abilene, Texas, Telephone Rate Case.

Hearing on petition of the Southwestern Bell Telephone Co. for permission to increase its rates in Abilene, Texas, from from $2.25 to $3 for residence telephones was heard by the city commission on June 3.

In its petition the company asserts that it lost over $23,000 in the operation of the Abilene exchange last year. A master in chancery appointed by the federal court held that the company had lost money in its Abilene exchange.

Higher Rates Net New York Telephone Company 8 Per Cent.

Figures submitted June 3 to the New York Public Service Commission by the New York Telephone Co. show that the 28 per cent increase in rates which became effective March 17, will produce a net return in excess of 8 per cent a year. This return is based on the earnings for April, the first full month of service after the new rates were charged. The net return to the company is figured on a valuation of the company's plant of $140,000,000.

The figures were presented to the commission because of a request made at the conclusion of the last hearing on a motion by the city to modify the increase on the ground that it was producing excessive returns. Chairman Prendergast, in making the figures public, said in an accompanying statement that the admitted true earnings of the company for April will be $1,006,009.30 and that:

"The order approving the increase in rates made in March last was issued primarily upon the assumption that the company had been called upon to make increases amounting to $11,000,000 in its salary and wage accounts. It would appear from the figures now submitted that if the admitted earnings for April would be the average monthly earnings for a year, the per annum earnings would be in excess of the amount it was proposed to cover in the order referred to."

Mr. Prendergast also said that on the basis of the April earnings the annual earnings would "be a trifle over 8 per cent." He said that the commission would make a thorough analysis of the figures to the end that the commission might be guided in its actions in relation to the company.

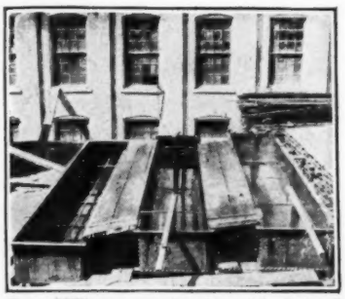
Accompanying the table showing in detail the financial account of the company for April was an explanatory statement signed by J. L. Swayze, the company's general counsel, which said that in January the company failed to earn its operating expenses by $144,831.01. In February it earned $38,821.92 more than its expenses and in March, nearly half of which was under the increased rate, its earnings were $126,208.24 more than its expenses. In April, a full month under the high schedule, the earnings had grown to $1,080,098.54 less charges to be made against it later, which it is estimated will reduce it to the amount stated, $1,006,009.30.

Rates in Eight Pennsylvania Counties Are Higher July 1.

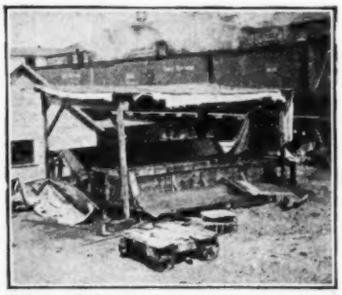
Increases in telephone rentals and provisions for service charges are announced by four telephone companies operating in Jefferson, Clearfield, Indiana, Clarion, Mercer, Forest, Warren and Lawrence (Pa.) counties, beginning July 1.

The rates filed with the public service commission by the Summerville Telephone Co. provide for an increase in installation charges of from $1.50 to $3. Changes are made in the New Bethlehem exchange and a two-party rental rate established.

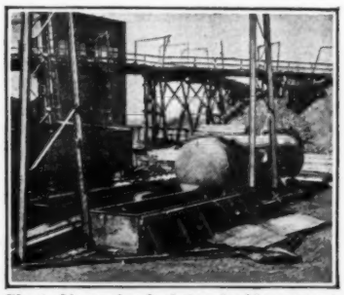
The Blacktown Telephone Co., operating in Springfield and Findley townships, Mercer county, increases residence telephones from $12 to $18 a year, and all other telephones from $16 to $20 a year. A discount of $2 a year is allowed for payments made before the 20th of the



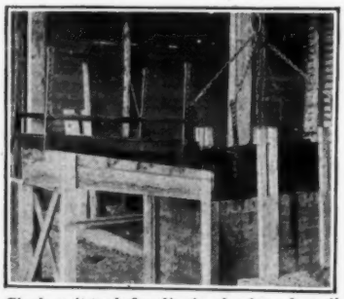
Paper Mill's permanent equipment for hot and cold treatment—three steel tanks for hot bath, cold bath and for drippings.



Industrial Plant's equipment for hot and cold treatment—two wooden tanks, lined with galvanized sheet iron, equipped with steam coils for heating preservative. Draining board at left.



Plant of iron mine for hot and cold treatment, with 10,000 gallon storage tank for preservative. Yard crane used for handling timber.



Single unit tank for dipping lumber of small cross-section, and species readily impregnated in heated Carbosota. Capacity: 400 pieces of 1 in. by 4 in. by 5 ft. per charge.

Barrett B Carbosota
Liquid Creosote Oil
For Preserving Wood

Carbosota has Popularized Wood Preservation—

CARBOSOTA Liquid Creosote Oil has made possible the more general practice of wood preservation.

Thousands of timber users the country over are increasing the life of structural wood—practicing timber conservation—through Open Tank treatment with Carbosota.

As will be seen by the illustrations, costly apparatus is not required. A non-pressure carbosoting plant, capable of treating small or large quantities of lumber, posts and timber, can be readily installed at reasonable cost.

Carbosota Liquid Creosote Oil is a highly refined and specially processed coal-tar creosote, particularly adapted for Surface treatments (brush treatment or painting, spraying and dipping), and the Open Tank process (hot and cold or hot and cooling, treatment). It conforms to standard specifications. Its superior feature is the low liquid point of 41° F.

Non-pressure treatments, either the Open Tank process or Surface treatments, are available to every consumer. Technical advice and literature free upon request.

(Green wood cannot be effectively creosoted by non-pressure processes. It should be seasoned. All framing, drilling of bolt holes, etc., should be completed before treatment. If this is impossible, two brush coats of Carbosota should be applied to all untreated surfaces exposed by subsequent cutting or drilling.)

The Barrett Company

New York Chicago Philadelphia Boston St. Louis
Cleveland Cincinnati Pittsburgh Detroit New Orleans
Birmingham Kansas City Minneapolis Dallas
Nashville Syracuse Seattle Peoria Atlanta Duluth
Salt Lake City Bangor Washington Johnstown Lebanon
Youngstown Milwaukee Toledo Columbus Richmond
Latrobe Bethlehem Elizabeth Buffalo Baltimore
Omaha Houston Denver Jacksonville

THE BARRETT COMPANY, LIMITED:
Montreal Toronto Winnipeg
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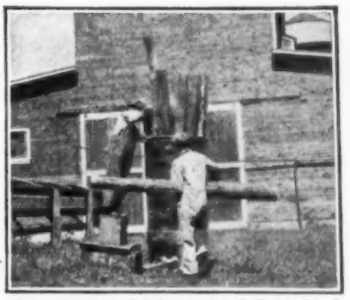
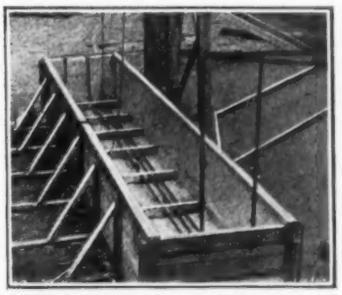
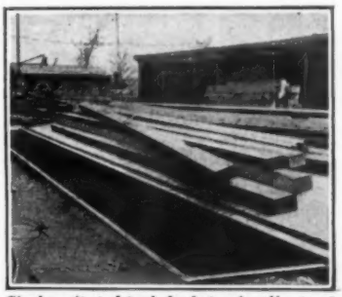


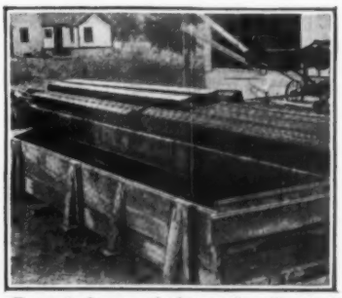
Butt-treating cedar fence posts by hot and cooling treatment. Typical farm equipment—110 gallon drum with fire place underneath.



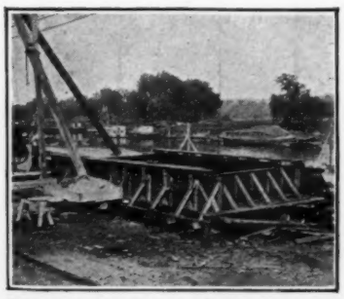
Small, single unit, hot and cooling wood tank lined with galvanized sheet iron; steam coils and two ton chain block hoist. Used mostly for creosoting in industrial repair work.



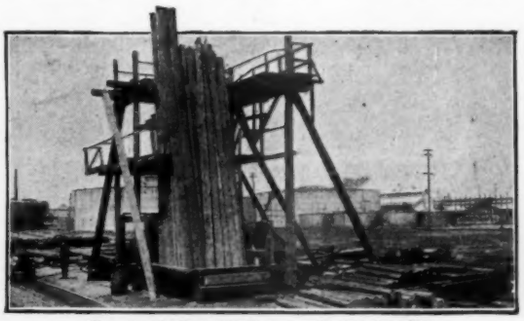
Single unit steel tank for hot and cooling treatment of freight car sills. Capacity 20 to 24 sills per 24 hour day.



Farmer's home-made hot and cooling tank, wood, lined with sheet iron, without steam coils, as work of treating silo staves is done in summer.



Single unit plant for hot and cooling treatment. Wood tank, lined with sheet metal, equipped with steam coils. Capacity: 10,000 ft. B. M., per 24 hour day.



Consumer's Open Tank process (hot and cooling treatment) cedar pole creosoting plant.

Single unit tank for creosoting coal mine shaft timber. Built of tongue and groove lumber, double wall, caulked, etc. Metal lining is preferable to guard against leakage.

month following that in which service is rendered.

The Forest Telephone & Telegraph Co., operating in Forest, Warren and Clarion counties, will increase individual business lines from $18 to $30 a year, and residence minimum rate on multi-party line from $12 to $15. Free use of residence telephones is limited to subscribers and members of their family or employes, and free use of business telephones is limited to officers and employes of the business.

The Princeton Telephone Co. will change the rate both for stockholders and non-stockholders to $20 a year, and will establish service connection charges.

Ordered to Re-establish Toll Service—Complaint Dismissed.

On complaint of W. F. Nolan, a subscriber of the Lower Beaver Valley Telephone Co. against the Peoples Telephone & Telegraph Co., alleging that the Peoples company had refused to furnish switching service at Buffalo Gap to the patrons of the company of which he is a subscriber, the South Dakota Railroad Commission issued an order on June 2, directing the Peoples company to restore service at once.

The Lower Beaver Valley company operates a single rural line running out from Buffalo Gap and is owned and operated by the subscribers on the line. It was formerly a part of the W. G. Flat Telephone Co., which company was in operation for a number of years in Custer county, South Dakota. On or about March 1, 1920, this company was disbanded and each of its several lines organized into separate associations or telephone companies.

The reason given by the Peoples company for the refusal of such service was that the subscribers of the Lower Valley company owe the sum of $10.75 for switching service performed prior to the dissolution of the W. G. Flat company, but rendered to the present subscribers on the complainant's line. The Peoples company claimed that the subscribers owed it $30.80, while the subscribers claimed a balance due of $20.05, leaving a sum of $10.75 in dispute.

In its opinion the commission stated that the question of a disputed account does not constitute a condition that warrants a company in refusing service, inasmuch as it has recourse to the courts for adjustment. The Peoples company was therefore ordered to re-establish service upon the payment of all dues and charges that are undisputed.

Rates to Be Raised When Physical Connection Is Completed.

On June 11 the Wisconsin Telephone Co. was authorized to increase its rates at Janesville, Wis., exchange by the state railroad commission, to be effective when the physical re-arrangement of the systems owned by it and the Rock County Telephone Co. is completed. All service will then be furnished through a single central office. The schedule of monthly rates is as follows:

Business, one-party	$5.00
Business, two-party	4.00
Business, extension	1.00
Residence, one-party	2.50
Residence, two-party	2.25
Residence, four-party	1.75
Residence, extension	.75
Rural, multi-party, within 6 miles from central office	2.25
Roadway service, per station (per year)	3.00

A schedule of rates for private branch exchanges was also authorized. The company will also place in effect its standard schedule of toll rates on the toll lines acquired by it from the Rock County Telephone Co.

The Wisconsin company operates an exchange in Janesville which is in competition with the Rock County Telephone Co.'s exchange. Messages were exchanged between the two systems over trunk lines for a charge of 5 cents per message.

The Wisconsin Telephone Co. proposes to purchase the exchange and rural line property, and the toll lines of the Rock County Telephone Co., exclusive of the real estate in Janesville on which the company's central building and garage are located. After this consolidation there will be 5,143 company telephones, including pay stations.

Galesburg (Wis.) Company to Construct New Exchange.

The Wisconsin Railroad Commission, on June 7, authorized the Galesburg Telephone Co. to construct and operate a telephone system with a central exchange at Galesburg.

Lines will be extended along roads, now unoccupied by other telephone lines, in the towns of Lessor and Navarine in Shawano county, and in the towns of Maine and Cicero in Outagamie county. Agreements have been entered into with the other telephone companies operating in that vicinity whereby the best possible service will be rendered to the community.

Increases Rate for Extension and Desk Telephones.

The Hubertus Telephone Co. will increase its rates for extension and desk telephones on July 1, by an order of the Wisconsin Railroad Commission. The new monthly rates are:

Extension bell	15 cents
Extension telephone:	
Talking set	50 cents
Complete set	75 cents
Residence desk telephones	25 cents

(In addition to wall telephone rate.)

The only rate in effect now for any of these services is 10 cents per month per extension bell.

The company operates a rural system in the vicinity of Richfield, South Germantown, and Hubertus, serving 27 business and 289 residence subscribers.

Switching Rate Increased at Shawano, Wis., Despite Protests.

A supplementary order issued to the Wisconsin Railroad Commission, on June 9, grants permission to the Wisconsin Telephone Co. to establish a switching rate of $7.50 per year per subscriber, at its Shawano exchange.

The two roadway companies, whose subscribers receive central office and other services from the company, protested at a rate in excess of $6 per year per telephone. They requested the commission to issue a writ of convenience and necessity to open a competing exchange at Shawano, if the switching rates exceeded $6 per year per telephone.

A detailed study by the commission of the cost to the Wisconsin company of rendering switching service to these companies showed that $7.50 per year per telephone was a fair rate. The company furnishes all wire plant equipment for the roadway companies inside the local exchange limits, and all the necessary equipment in connection with the operation of the switchboard.

Oakridge & Niebull (Wis.) Co. to Serve Hancock, Wis.

In an order issued May 31, by the Wisconsin Railroad Commission, the Oakridge & Niebull Telephone Co. is granted authority to install a switch at the Gilbert Holcomb residence whereby its lines and the lines of the Union Telephone Co. leading to the city of Hancock may be connected. A charge of 2 cents for each call will be made.

The community served by the Oakridge & Niebull Telephone Co. has been without telephone service into the city of Hancock. The fact that the community does practically all of its business with Hancock should make this exchange a great convenience.

Summary of Commission Rulings and Schedule of Hearings.

ALABAMA.

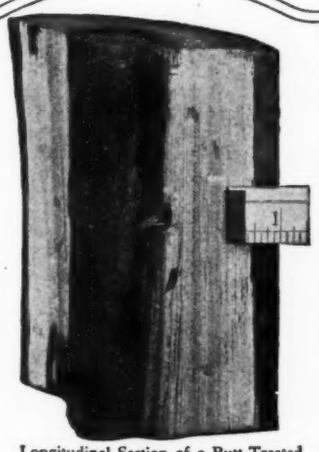
July 5: Hearing at Montgomery on application of the citizens of Wetumpka for an indefinite extension of the free rate on telephone charges in the case of the city of Wetumpka against the Southern Bell Telephone & Telegraph Co., which was decided some time ago in favor of the telephone company, suspending free service between Wetumpka and Montgomery after September 1 on telephones subject to toll exemption.

CALIFORNIA.

June 4: The McFarland Telephone Co., operating in Kern county, authorized to file within 30 days a new schedule of rates and services.

ILLINOIS.

June 14: Hearing at Springfield in the matter of proposed increase in rates in



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Decatur, Harristown, St. Joseph, Springfield, Cantrall, Buffalo, Mechanicsburg, Riverton and Rochester by the Illinois Bell Telephone Co.; petition filed by company for hearing on order of commission dated March 22, 1921.

June 14: Hearing at Springfield in the matter of joint application of the Illinois Bell Telephone Co. and the Mutual Telephone System of Mulberry Grove for approval of sale by the former and purchase by the latter company of certain rural telephone lines now connected with the Trexler exchange; petition filed by the Illinois company for second supplemental order extending time within which to complete transfer of property as required in order of February 1, 1921.

June 14: Hearing at Springfield on application of the Illinois Bell Telephone Co. for authority to sell certain telephone property located in Chandlerville and for authority for purchase by H. A. Clegg, operating a telephone company in Chandlerville, for the sum of $50.

June 17: Hearing at Springfield in the matter of proposed increase in rates for telephone service in Murphysboro and 23 other municipalities by the Murphysboro Telephone Co.; petition filed by the company for hearing on order of commission dated April 14, 1921.

June 17: Hearing at Springfield on application of the Citizens Mutual Telephone Co. of Cambridge for authority to increase rates.

MINNESOTA.

June 9: The Hector Telephone Exchange Co. of Hector, and the Dodge Center Telephone Exchange Co., of Dodge, authorized to increase rates.

June 10: The Hayfield Telephone Co., of Hayfield, and the Midland Telephone Co., of Adrian and Ellsworth, granted increased rates. The Midland company will also establish service connection and other miscellaneous charges.

June 22: Hearing at Clarkfield on application of the Clarkfield Telephone Co., of Clarkfield, for authority to increase its local and rural rates and establish service connection and other miscellaneous charges.

July 8: Hearing at Sebeka on application of the Sebeka Telephone Co. for authority to increase its local and rural rates and establish service connection and other miscellaneous charges at Sebeka.

MISSOURI.

May 24: The Home Telephone Co., of Joplin, authorized to file increased schedules of rates for service at its Carterville, Purcell, Oronogo, and Carl Junction exchanges to become effective July 1 and remain in effect for 13 months.

May 26: The Hale Telephone Co., of Hale, granted permission to continue in effect its present schedule of temporary rates for a further period of 13 months, from June 1 to July 1, 1922.

June 1: The Farmers Telephone Co. of Harrison county authorized to file schedule of increased rates for its Ridgeway, Gilman City, Edinburg, Brimson, Bridgeport and Bethany exchanges.

June 1: Schedule of increased rates filed by the Machens Westalton Telephone Co., proposed as effective for its Machens exchange rejected, the commission finding the rates excessive. New schedule ordered filed.

NEBRASKA.

June 27: Hearing on application of the Northwestern Bell Telephone Co. for permission to continue indefinitely the 10 per cent surcharge permitted by an order issued December 1, 1920, and expiring July 1, 1921, on all exchange rates, and for permission to increase the differential between station-to-station and person-to-person calls from 25 to 40 per cent and to increase other differentials correspondingly.

NEW HAMPSHIRE.

June 3: George W. Lincoln, of Hillsborough, operating a telephone utility in Hillsboro, Antrim, Deering, Bennington and Henniker, under the name of the Contoocook Valley Telephone Co. authorized to sell this telephone property to Philip C. Lockwood, of Manchester.

NEW YORK.

June 9: Complaint filed by subscribers in Stanley against the Seneca-Gorham Telephone Co. over rates dismissed at the request of A. L. Gardiner, of Canandaigua, representing complainants. The complaint was dismissed without prejudice to a further complaint over new rates proposed by the company if they are not satisfactory.

NORTH CAROLINA.

June 3: The Southern Bell Telephone & Telegraph Co. authorized to raise its residence rates 25 cents per month and business rates 10 per cent, effective as of June 1, throughout the state.

NORTH DAKOTA.

June 6: Application filed by the Farmers Telephone Co. of Starkweather, for authority to abandon certain telephone lines in Cavalier county.

June 6: Application filed by the Northwestern Bell Telephone Co. to discontinue service station switching for the Forman Telephone Co.

June 6: Complaint filed by Alfred Springer, of Wyndmere, against the Northwestern Bell Telephone Co., in re service rendered.

June 6: The Rocky Ridge Telephone Co., of Scranton, granted permission to abandon and remove two miles of telephone line.

June 13: Complaint filed by C. U. Sommers against the Northwestern Bell Telephone Co. in re telephone service.

June 22: Hearing at Buffalo on application of the Buffalo Telephone Co., of Buffalo, for authority to increase rates.

June 22: Hearing at Edinburg on application of the Edinburg & Gardar Telephone Co. for authority to increase rates.

OHIO.

June 30: Hearings at Columbus on applications of the Central District Telephone Co. and the Warren & Niles Telephone Co., of Warren, for authority to increase rates.

OREGON.

July 18: Rehearing at Portland of the Pacific Telephone & Telegraph Co.'s rate case.

SOUTH DAKOTA.

June 2: Order issued on complaint of Clarence Chamberlain and George Moxon against the Dakota Central Telephone Co. requiring the company to furnish two-exchange service to subscribers on its rural lines connecting with the cities of Colman, Egan and Flandreau upon the payment of $1.50 per year per telephone in addition to the regular exchange rate of $1.25 per month. Complaint asking that exchange rates be reduced dismissed, the commission finding the rates reasonable as compared with those charged by other companies of like size and operating under similar conditions.

June 2: Complaint of W. F. Nolan, a subscriber of the Lower Beaver Telephone Co. against the People's Telephone & Telegraph Co., alleging that the People's company had refused to furnished toll service to the company of which he is a subscriber, dismissed. The People's company was ordered to re-establish service upon the payment of all dues and charges not in dispute.

WISCONSIN.

June: The Hubertus Telephone Co., of Hubertus, authorized to increase its rates for extension and desk telephones.

June 7: The Galesburg Telephone Co. authorized to construct and operate a telephone system with a central exchange at Galesburg.

June 7: The Belmont & Pleasant View Telephone Co. permitted to place in effect a toll rate of 10 cents.

June 9: Supplementary order issued authorizing the Wisconsin Telephone Co. to establish a switching rate of $7.50 per year at its Shawano exchange.

June 10: Order issued authorizing the Badger Telephone Co., of Oconomowoc, to issue 500 shares of its capital stock of the par value of $10 per share, making a total issue of $5,000 for the purpose of securing funds for additions and extensions of its property and plant and all for purposes properly chargeable to capital account.

June 10: Certificate issued authorizing the Port Wing Telephone Co., of Port Wing, to issue 1,578 shares of its capital stock of the par value of $1 per share for the purpose of securing funds for additions and extensions to its property and plant.

June 10: Certificate issued authorizing the Athens Telephone Co., of Athens, to issue $4,000 of its capital stock for the purpose of securing funds with which to purchase the property of the Goodrich Telephone Co. for the sum of $3,000 and also to provide $1,000 for additions and extensions to its property and plant. The commission found the value of the property of the Goodrich Telephone Co. for the purpose of this proceeding to be $3,000.

June 10: Certificate issued authorizing the Ogema Telephone Co., of Ogema, to issue 550 shares of its capital stock of the par value of $10 per share, making a total issue of $5,500 to pay certain notes held by the State Bank of Ogema amounting to $4,700, which amount was used for additions and extensions to the property and plant of the company; and also to provide funds for future additions and extensions.

June 10: Certificate issued authorizing the Cecil-Green Valley Toll Line Co. to issue $4,365 of its capital stock and to distribute the same, equally, share for share, among the holders of the stock of the said corporation now outstanding, for the purpose of bringing to the total amount of its outstanding stock, bonds, notes and other evidences of indebtedness more nearly to an equality with the value of its property. The commission found that the value of the property of the corporation on June 2, 1921, exceeded $13,500.

June 11: The Wisconsin Telephone Co. authorized to increase its exchange rates at Janesville, when the physical rearrangement of the systems owned by it and the Rock County Telephone Co. are completed.

June 15: Hearing at Madison on application of the Eureka Telephone Co., of Woodland, for authority to increase its rates. U-2518

June 16: Hearing at Madison on application of the Independence Telephone Co., of Independence, for authority to increase its rates. U-2517

June 16: Hearing at Madison on application of the Wisconsin Telephone Co. for authority to increase rates at its Stevens Point exchange. U-2486

June 17: Hearing at Madison on application of the Farmers Inter-County Mutual Telephone Co., of Kilbourn, for authority to increase rates for telephone service. U-2522

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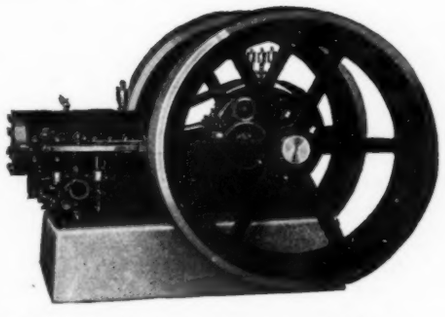

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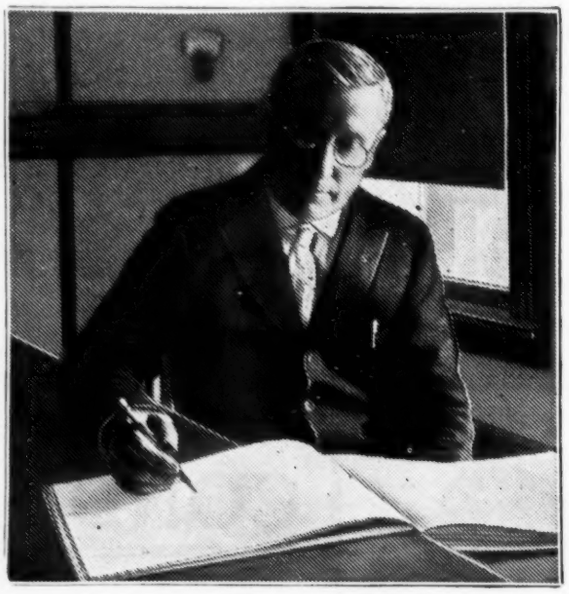
Biographical and Personal Notes

D. C. Phillips, owner of the Citizens' Telephone Co., Marengo, Iowa, has an interesting and rather unusual life story. He was born at Braidwood, Ill., June 26, 1875, the son of a coal miner. In 1884 his family moved to Iowa, locating at Kirkville and it was from the Kirkville High School, June 7, 1890, that he was graduated, the only coal miner's child in the class and carrying the honors for three years' high school work.

Directly after the graduation the Phillips family moved to Hiteman, Iowa, and the young man began work as the "greaser" at the mines. He followed different lines of work around the mines, until 1896 when he became a helper in the office of the superintendent who was a mining engineer. It was in this year that he took up work with the International Correspondence Schools and he attributes not a little of his success to the fact that his employer, Phil H. Waterman, permitted him to study during working hours, when he was not otherwise employed. These study hours together with those spent at night helped him to earn two engineering certificates.



Interesting and Rather Unusual Is the Life Story of D. C. Phillips, Owner of the Citizens Telephone Co., Marengo, Iowa.

In 1899 Mr. Phillips was doing the engineering work for the Wapello Coal Co., at that time the largest concern of its kind in Iowa. In 1902 he was appointed mining engineer of the State Board of Mine Examiners under Governor Cummins, holding the position for three years, in addition to holding his position with the mining company.

During these years Mr. Waterman, "D. C.'s" employer, had built a telephone system, connecting the mines, offices, and homes of the foremen of departments. He also had telephones under ground, long before the mine telephone came into existence and bought what is said to be the second mine telephone (Stromberg-Carlson) manufactured.

"D. C.'s" inclination led him to look after the troubles of this little system of 30 telephones. And he liked the work so well that he answered an advertisement of a telephone plant, for sale and in May, 1906, found himself the majority owner and manager of the telephone plant at Monroe, Iowa.

Mr. Phillips insists that right here a word of credit be given to the "good girl" he married in 1898 who directed his thought toward having a business of his own. "The same girl is still on the job," he says, "and had I followed her advice and stayed in the telephone business, this would have been a different story—but—" in 1913 he sold out the plant, which had grown from 410 subscribers to 620. During these years the town had been cabled, every foot of rural line had been rebuilt, and a new office erected.

Taking the money thus made, Mr. Phillips went into an emigration scheme in the Rio Grande Valley. "But," he says, "we had not consulted the Kaiser, and his war broke us up. Had enough money left to buy a store in Indianola, Iowa, which I operated for two years, but all the time was anxious to get back into the telephone business. Answered every advertisement and looked at several propositions. I finally bought the Marengo plant, and started here the same day that Burleson took over the telephone business of the country, August 1, 1918."

In Marengo, Mr. Phillips found a plant of 510 telephones, everything rundown, and the public extremely out of sorts with the company and service. He also found a competitive mutual company with a town exchange and 210 subscribers.

During his stay in Indianola, Mr. Phillips had become acquainted with H. A. Ewing, wire chief of the telephone company there. He arranged to sell Mr. Ewing some stock in the Marengo company and secured his services as wire chief. Mr. Ewing proved to be a very valuable helper in the office as well as in public relation. To him Mr. Phillips gives a great deal of the credit for the fact that in June, 1919, the company purchased the mutual competitor and on July 1 combined the plants. The rates were very low and were raised on January 1, 1919, while the company was under government control. The company has now 822 stations and switches for 107.

Mr. Ewing was made manager the first of January, 1919, but in the fall met with an accident and left the company's employ. He was succeeded by H. F. Brammann, whom Mr. Phillips praises most highly. And he also gives a great deal of credit to his helpers, Mrs. Maude Bishop, chief operator, Sophia Kienle, Mrs. Clara Brammann, Gertrude Englebert, Stella Spies and Mrs. Joe Willis.

Mr. Phillips is also president of the Williamsburg and Baxter Telephone companies.

Sigurd Indrehus, maintenance engineer of the Bergen Telephone Co. of Bergen, Norway, commissioned by the Norwegian government to study telephone practices in the United States, has just completed a six weeks' study in this country and is about to return to his native shores to apply the results of his observations to a new system of communication in Norway.

In commenting upon the telephone practices in this country, Mr. Indrehus said that he was particularly impressed by the rigid requirements and high standards maintained by the manufacturing and operating companies.

Mr. Indrehus was surprised to note the importance of the telephone as a regular household appliance in the United States. In Norway, most of its use is confined to business matters.

The telephone has become very popular in Norway. While there are few telephones compared with the per capita distribution throughout the United States, Norway ranks well up among its European neighbors in their efforts to extend communication facilities. The mountainous character of the country makes all additions to the telephone system very expensive ventures.

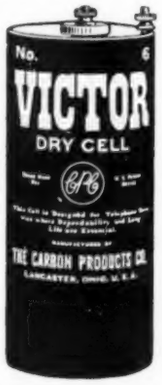
The Norwegian universities are making extensive study of communication problems. The technical schools are quite universally introducing special courses in telegraphy and telephony.

Obituary.

Damascus S. Parker, manager of the Pomona (Cal.) Valley Telephone & Telegraph Union, since its inception in 1903, died at the Pomona Valley hospital May 27. Pneumonia, contracted after a serious operation was the cause of his death.

Mr. Parker was a short time ago re-

All Prices on Victor Batteries Revised June 10th, 1921



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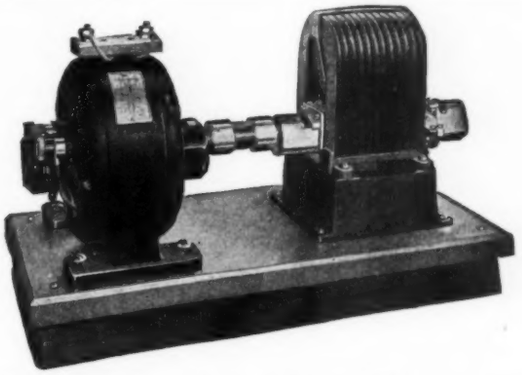

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elected president of the California Telephone Association, and had also served as a director of the United States Independent Telephone Association.

Mr. Parker's policy of making his company serve the most subscribers at the least cost was said to have been responsible for the growth of the Pomona Valley company whose service is claimed to be unequalled in any other city of Pomona's size, especially with respect to the far-reaching lines connected with the main office there.

One of Pomona's pioneers, Mr. Parker went there from Humboldt, Iowa, in 1887. He was born in Indiana, February 18, 1859, and moved to Iowa with his parents. In addition to being a telephone man, Mr. Parker was associated in the management of one of the local newspapers, and was a founder of the Pomona co-operative grocery store.

Bertram DeWitte Wilber, state engineer for the Indiana Bell Telephone Co., died at his home in Indianapolis on June 9 at the age of 47 years, after an illness of six months. Mr. Wilber had won the Indianapolis golf championship a number of times and was at one time amateur golf champion of Indiana.

He was born in Grand Rapids, Mich., and following his graduation from the University of Michigan in 1899, was employed by the Western Electric Co. Later Mr. Wilber entered the employ of the Central Union Telephone Co. and went to Indianapolis in 1905. He was a member of the Masonic fraternity, the Scottish Rite and the Shrine, and is survived by his widow, his mother, one brother and two sisters.

From Factory and Salesroom

H. B. Price Is Made Belden Advertising Manager.

A recent announcement of interest is that of the appointment of H. B. Price as advertising manager of the Belden Mfg Co. Mr. Price's connection with the Belden organization has extended over a period of about six years and has covered many phases of the business, including engineering, production, outside and inside sales work.

Prior to his association with the Belden Mfg. Co., after his graduation from De Pauw University, Mr. Price was connected with the manufacturing methods department at the Hawthorne plant of the Western Electric Co.

H. S. Greene Now Actively Associated with Barber-Greene.

It is announced that H. S. Greene, assistant general sales manager of the National Carbon Co. and formerly general sales manager of Nungesser Carbon & Battery Co., which was acquired by the National Carbon Co., is now actively associated with the Barber-Greene Co. as a vice-president.

For several years Mr. Greene has been a director of the company of which his brother is a vice-president and treasurer. The Barber-Greene Co. is a manufacturer of bucket loaders and portable and permanent standardized belt conveyors.

McKay, Engineer, Utilities Dept., American Appraisal Co.

Charles W. McKay, until recently president of the firm of McKay and Sherman of Chicago, has become identified with the American Appraisal Co., Milwaukee Wis., in the capacity of engineer, public utilities department.

Mr. McKay needs no introduction to TELEPHONY's readers for he has been the author of many contributions within the last few years. He has specialized in telephone engineering and appraisal work since his graduation from Cornell university in 1906 with the degree of M.E. He was with the New York Telephone Co. for about six years, engaged in appraisal work and plant engineering.

Severing his connection with the New York Telephone Co. early in 1912, Mr. McKay was for a time associated with

Charles W. McKay, Engineer, Public Utilities Department, American Appraisal Co.

Henry Floy in the capacity of assistant engineer. In the summer of 1913 he became engineer to the McCall & Clark Co., efficiency experts of New York, and in October of that year affiliated himself with McMeen & Miller of Chicago. The major portion of Mr. McKay's time with this well known firm was spent on problems involving the appraisement of telephone properties.

After leaving the employ of McMeen & Miller, he was associated with the Central Union Telephone Co. in valuation work. He later accepted the appointment as appraisal engineer for L. V. Estes, Inc.

Mr. McKay's present association affords him opportunity to render his old friends in the telephone field excellent service in connection with their rate and valuation problems. During the past 18 months he has represented a large number of Independent companies in rate cases.

The American Appraisal Co. is said to be the largest and one of the oldest firms of appraisal engineers in the world. Its public utilities department has been identified during recent years with some of the most important valuation and rate cases, both in the United States and in Canada.

The Columbia Dry Batteries Have Taken a Drop in Price.

Announcement has been made by the National Carbon Co., Inc. Cleveland, Ohio, of a reduction in price of standard types of Columbia dry batteries.

This reduction in price includes the following brands of dry cells and unit batteries manufactured by the company: Columbia ignitor, Columbia gray label, Columbia red label dry cells, the Columbia hot shot and Columbia multiple unit batteries, and the new Columbia bell ringer battery. The three barrel assortments, consisting of different combinations of Columbia ignitor dry cells, Columbia hot shots, and Columbia bell ringer unit batteries have also been included in the price reduction program. All new prices were effective as of June 1, 1921.

An extensive newspaper advertising campaign is being used by the National Carbon Co., Inc. to inform the public of the lower cost of Columbia dry batteries. All Columbia dealers have also been supplied with a window poster announcing this fact.

More Automatic Telephone Equipment for India.

When the Department of Posts and Telegraphs of the Indian government undertook to equip the city of Simla—the summer capitol of the Empire—with an automatic telephone exchange some years ago, it was regarded by some as more or less of a venture, since equipment of the Strowger type had never

Exide
BATTERIES

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THE AUTOMANUAL SYSTEM—An automatic system without dials, in which a few operators control the switching machines of a large exchange.

THE AUTOMANUAL SATELLITE—In which the machine switches in distant villages are controlled from AUTOMANUAL keyboards at a city exchange.

THE DIAL AUTOMATIC SYSTEM—In which the machine switches are controlled by dials at the subscribers' stations.

THE ALL-RELAY SYSTEM—In which there are relays only, with no moving selectors; adapted for dial or keyboard control.

THE NEW AUTOMATIC DIAL—Our latest product.

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GALION, OHIO

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been operated under precisely these climatic and service conditions.

According to statements of the government engineers who studied the subject at the time, two conditions prevailing at Simla made the automatic system especially desirable. One of these was the very polyglot character of the population, including not only Europeans, but natives who spoke many different dialects. No one or two or three languages were sufficient for the telephone operators at this exchange, and this fact had seriously interfered with the effectiveness of the service.

This condition is not peculiar to Simla, being encountered in many other cities, and is present to a greater or lesser degree in all metropolitan centers. A second factor was, however, rather more exceptional. During the residence of the government at Simla the population is greatly increased, much business transacted, and a heavy burden placed on the telephone system. At other times the traffic drops off to only a small percentage of the peak load. This necessitated either carrying a large staff through the idle period, or building up a new organization to meet the seasonal demand.

Since the maximum capacity of the automatic system is always available at practically no extra operating expense, this feature appealed very strongly to the Indian engineers, and Strowger equipment was specified and installed. Since that time the exchange has doubled in size, and another automatic exchange of the same type has been installed and placed in operation in the city of Lahore.

It is now announced that the International Automatic Telephone Co., Ltd., of London, has accepted an order for an installation of an installed ultimate of 2,000 lines, for the city of Poona, a place of about 160,000 inhabitants located not far from Bombay, on the west coast of the peninsula.

The apparatus will be manufactured at the Liverpool factory of the Automatic Telephone Mfg. Co., Ltd., which operates under the Strowger patents. This company is rapidly expanding its capacity to meet the very heavy demand for equipment of this type. But even allowing for this increase, the production of this organization is already booked for practically a full year ahead.

Paragraph.

RUNZEL-LENZ ELECTRIC MFG. CO., 1751 North Western Ave., Chicago, is celebrating the commencement of its 18th year in business by the occupation of a three-story (45 ft. by 62 ft.) addition to its plant. The new addition has a total of 8,320 square feet of floor space. Originally the plant contained 22,500 square feet.

E. J. IRISH, widely known in the telephone field as manager for T. J. Cope, announces that he has severed his connection with that organization and is now manufacturing underground and overhead supplies and tools of every description. Mr. Irish plans to manufacture on a large scale especially, bonding wire and durable wire rope at the lowest possible prices. His plant is at 628-830 Filbert St., Philadelphia.

Pacific Telephone & Telegraph Co. to Open New Exchanges.

Opening of several new telephone exchanges and general improvement of all lines and switchboards is announced by the Portland, Ore., branch of the Pacific Telephone and Telegraph Co. According to C. E. Hickman, superintendent of the office, between $3,000,000 and $4,000,000 will be expended in the work.

More than 1,600 telephones will be switched from Sellwood, Tabor and "B" automatic exchanges into the new Arleta automatic exchange and eight new sections of switchboards will be added to the Broadway exchange, according to reports.

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TELEPHONE SUPPLIES
NORTHWESTERN ELECTRIC EQUIPMENT COMPANY
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